pLoads

Energy control solution

CAREL

ENG User manual

LEGGI E CONSERVA QUESTE ISTRUZIONI

READ AND SAVE THESE INSTRUCTIONS

Integrated Control Solutions & Energy Savings

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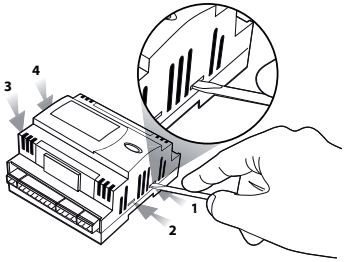
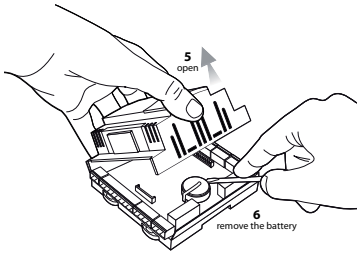
Guidelines for disposal

- Do not dispose of the product as municipal waste; it must be disposed of through specialist waste disposal centres.
- The product contains a battery that must be removed and separated from the rest of the product according to the instructions provided, before disposing of the product.
- Improper use or incorrect disposal of the product may negative effects on human health and on the environment.
- The public or private waste collection systems defined by local legislation must be used for disposal.
- In the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.





IMPORTANT: separate as much as possible the probe and digital input cables from cables to inductive loads and power cables, so as to avoid possible electromagnetic disturbance. Never run power cables (including the electrical panel cables) and signal cables in the same conduits.

1. PRESENTAZION

The **pLoads** device can handle several different functions, depending on system requirements:
1. load scheduler;
2. load cut-off;
3. energy meter collection;
4. consumption measurement (energy, water or gas).

All these functions can be used at the same time.
The different connection modes are illustrated below.

1. Load scheduler

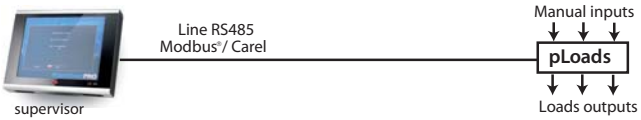


Fig. 1.a

2. Load cut-off

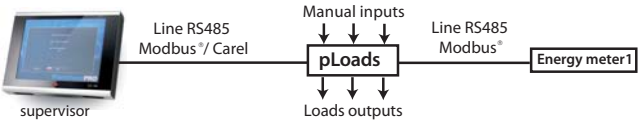


Fig. 1.b

3. Energy meter collection

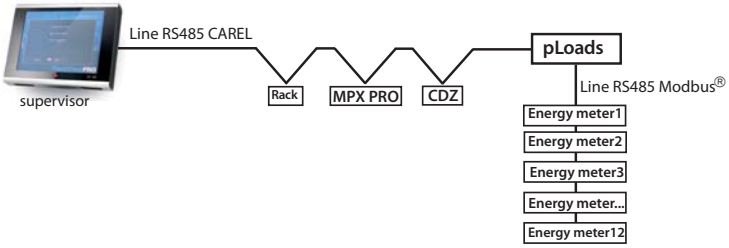


Fig. 1.c

4. Consumption measurement

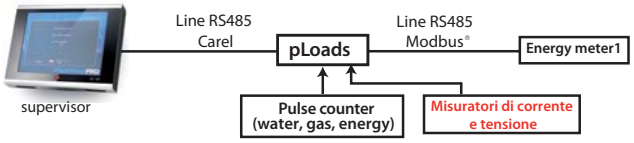


Fig. 1.d

Versions available

The controller is available in two versions, which differ in terms of the number of I/Os and communication ports available (for details see the input/output table):

Hardware type	Description	CAREL code
Compact	Built-in display + USB + RS485 optoisolated	PLO550X30U000
Large	Built-in display + USB + RS485 built-in optoisolated	PLO550L30UB00

2. USER INTERFACE

pLoads features the pGD1 "built-in" terminal as the user interface. This device features the following buttons:

	Alarm	displays the list of alarms;
	Prg	accesses the main menu tree;
	Esc	returns to the previous screen;
	Up	scrolls a list upwards or increases the value shown on the display;
	Down	scrolls a list downwards or decreases the value shown on the display;
	Enter	enters the selected submenu or confirms the set value.

Tab. 2.a

2.1 Display

Main screen

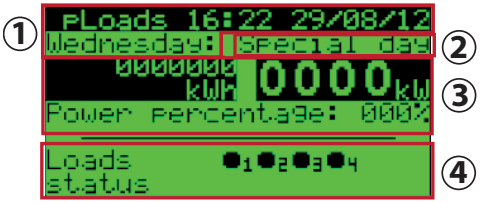


Fig. 2.a

❶	date, weekday and time
❷	type of current day
❸	current power in kW, energy in kWh and percentage of power in relation to load cut-off threshold
❹	load status (7 possibilities)

Tab. 2.b

This is the screen displayed during normal unit operation: from any other menu press ESC until reaching this screen.

The following icons may be displayed in the loads area (❹):

	the load is on
	the load is off
	the load has been cut off
	the load is on from supervisor
	the load is off from supervisor
	the load is on from digital input
	the load is off from digital input

Alarm screens

If an alarm is active, the red LED under the ALARM button flashes.

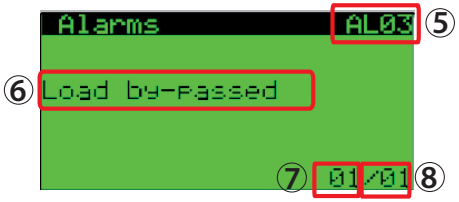


Fig. 2.b

❺	alarm code;
❻	alarm description;
❼	alarm number;
❽	total number of active alarms.

Use the arrows (UP and DOWN) to scroll the list of alarms; at the end of the list, pressing ENTER on the special screen directly accesses the alarm log.

For details on the alarms, see the alarm table, chapter 11.

Parameter display and editing screens

To access these screens, from the main screen press PRG to enter the menu list: scroll the menus using the UP and DOWN buttons and press ENTER to select the desired menu (see the function tree).

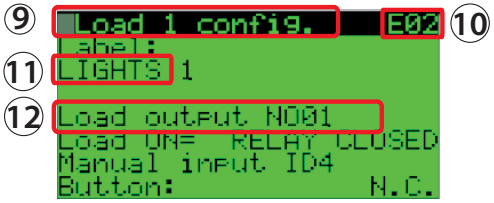


Fig. 2.c

❾	name of the function edited on the screen
❿	screen index
⓫	editable value
⓬	parameter name.

Note: editable fields feature numeric values or upper case letters.

3. SYSTEM ARCHITECTURE

pLoads, as illustrated in chapter 1, Presentation, is a device that manages several functions. For greater system flexibility, pLoads can also integrate wireless devices. The flexibility of the architecture proposed in fact allows more complex installation requirements to be met, in which the energy, water and gas meters are often located quite some distance apart, and thus serial connection over an RS485 network is not always practical.
The diagram shown below illustrates a typical installation in which the energy meters are connected to the pLoads controllers over the wireless network.
The diagram highlights the connections for pLoads Large, however the same also apply to the Compact model.

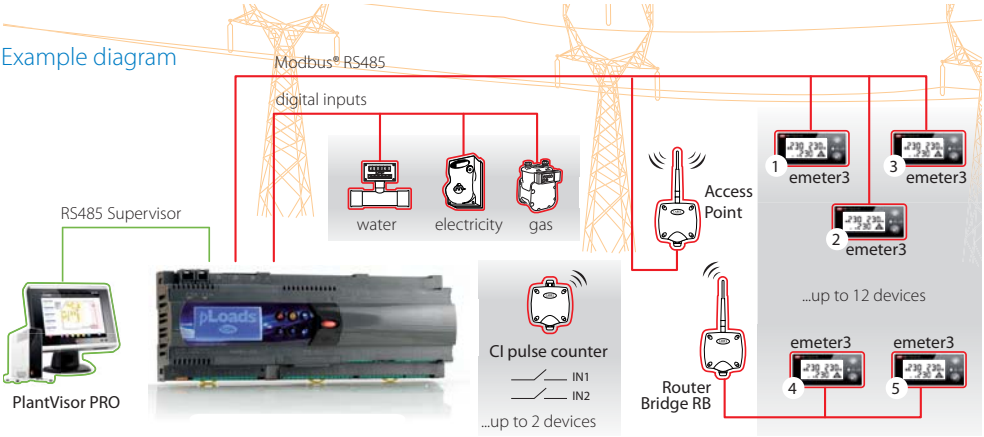


Fig. 3.a

DEVICE	ADDRESS NETWORK Modbus® RS485
Access point	1
Energy meter	2…13
Pulse counter CI	30, 31

Important:

- The addresses of the energy meter must be consecutive, even if the RB Router Bridge is used
- The address of the AP Access Point must always be 1.
- The addresses available for the energy meters are always between address 2 and address 13.
- The address of the main energy meter (used to manage load cut-off) is always 2.
- The addresses of the CI wireless pulse counters must be 30 and 31.
- If the wireless network includes an RB Router Bridge, all the energy meters should be connected to one or more RB Router Bridge device. Energy Meters and Access Points cannot coexist on the same RS485 line, as the stop bits are not always compatible between these devices. This is true, for example, for the 'CAREL emeter3'; consequently, check compatibility with the energy meters available in the network and managed by the pLoads controllers.
- For further details on operation of the CAREL wireless system, see manual +0300030xx.

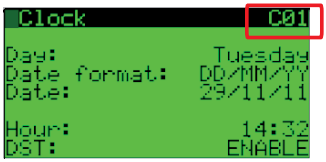
4. MAIN MENU – FUNCTION TREE

		Main menu			Settings menu (with password)
A.		General On-Off			
B.		Unit status			
		Settings	C.		Clock
		LogOut	D.		General configuration
			E.		Load configuration
			F.		Other

Tab. 4.a

Note: the settings menu is accessed after entering a 4-digit password. There are two types of password: installer and user. The installer password allows read/write access to the parameters, while the user password gives read-only access. These passwords can be set on the corresponding screens.

Note: the menu structure is reflected by the screen index.
See the following example:



When selecting the following item in the menu:

C. Clock

the letter of the original menu will be shown at the top right of the screen.

Note: after entering the user/installer password, the LogOut function will be shown on the main menu. The password will need to be entered again after selecting LogOut or in any case after 10 minutes of no activity.

Password:

Mask index	Display description	Description	Default	UM	Values
---	Insert password	Password for the access level management	1234: User 1234: Manufacturer	---	0…9999

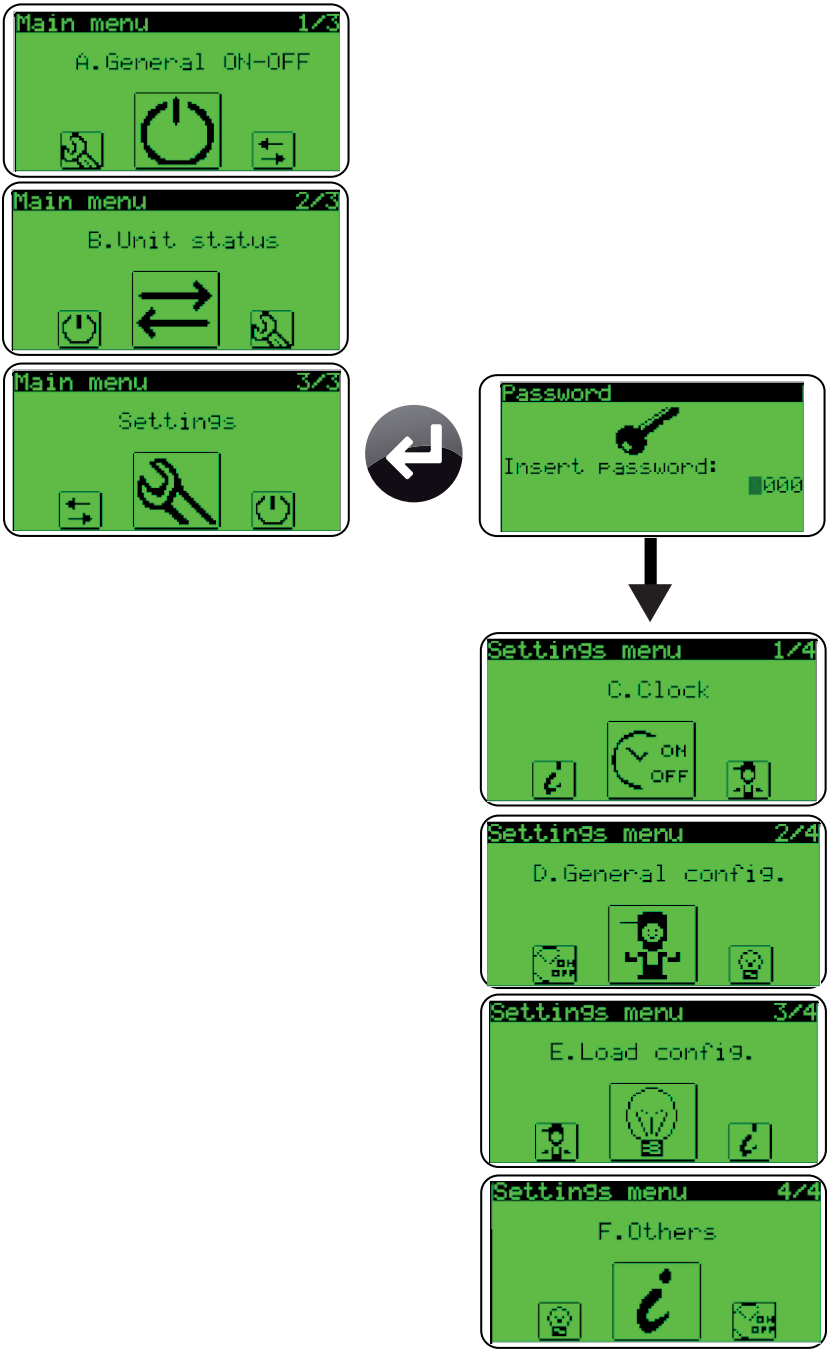
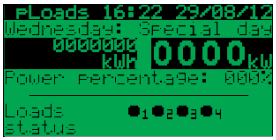

Main menu 1/3
A.General ON-OFF
Main menu 2/3
B.Unit status
Main menu 3/3
Settings
Password
Insert password:
000
Settings menu 1/4
C.Clock
ON
OFF
Settings menu 2/4
D.General config.
Settings menu 3/4
E.Load config.
Settings menu 4/4
F.Others

Fig. 4.a

5. USER FUNCTIONS

The controller can be used to schedule on and off times for the loads. Time scheduling is only active when the general ON-OFF parameter is enabled. This parameter can be set either via a manual input or parameter on the screen. Scheduler status is shown on the main screen:

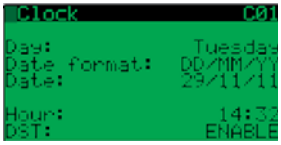
Scheduler activated



Scheduler deactivated

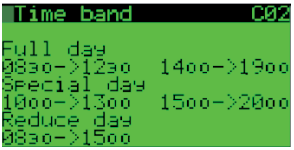
5.1 Clock setting

The user interface can be used to set the general scheduler and the on/off times for each load.

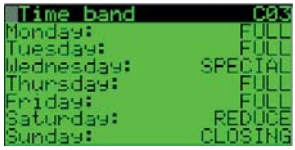


The date format, current day and time can be set. In addition, on the next screen, C02, automatic daylight savings changeover can be set.

5.2 General scheduler setting



Four types of days are available (Ordinary, Special, Short and Closing). The opening time and closing time can be set for each type of day. Minimum setting resolution is 1 minute.

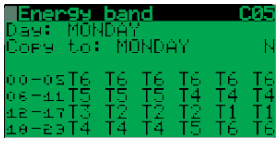


Select the type of day for each day of the week, from those available as set previously.

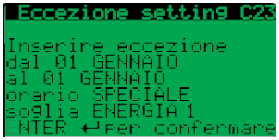
5.3 Energy scheduler configuration

To use pLoads as a load cut-off device, 'power', 'energy' or 'apparent power' thresholds can be set, and are selected automatically by the scheduler throughout the day. This is done on the screens provided, used to set up to six power, energy or apparent power thresholds for each hour of the day. The table below shows how the different thresholds can be set over the 24 hours of the selected day. For further details, see paragraph 8.2 'Load cut-off'.

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Monday	T1	T1	T1	T1	T1	T1	T1	T2	T2	T2	T2	T2	T2	T2	T2	T2	T2	T3	T3	T3	T3	T3	T4	T4
Thusday	T1	T1	T1	T1	T1	T1	T1	T2	T2	T2	T2	T2	T2	T2	T2	T2	T2	T3	T3	T3	T3	T3	T4	T4
Wednesday	T1	T1	T1	T1	T1	T1	T1	T2	T2	T2	T2	T2	T2	T2	T2	T2	T2	T3	T3	T3	T3	T3	T4	T4
Thursday	T1	T1	T1	T1	T1	T1	T1	T2	T2	T2	T2	T2	T2	T2	T2	T2	T2	T3	T3	T3	T3	T3	T4	T4
Friday	T1	T1	T1	T1	T1	T1	T1	T2	T2	T2	T2	T2	T2	T2	T2	T2	T2	T3	T3	T3	T3	T3	T4	T4
Saturday	T3	T3	T3	T3	T3	T3	T3	T4	T4	T4	T4	T4	T4	T4	T4	T4	T4	T5	T5	T5	T5	T5	T6	T6
Sunday	T3	T3	T3	T3	T3	T3	T3	T4	T4	T4	T4	T4	T4	T4	T4	T4	T4	T5	T5	T5	T5	T5	T6	T6



Each hour of the day can be associated with a specific energy threshold. The settings can be copied from one day to another, or for the entire week. Consequently, a different energy profile can be set for each individual day.

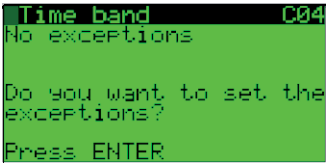


Exceptions are used to set the time period, type of day and energy profile for specific dates.

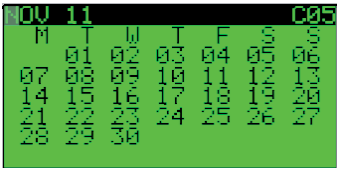
5.4 Exceptions to general scheduler

Up to 15 special periods can be set, representing exceptions to the general scheduler.

Screen for entering the exceptions.

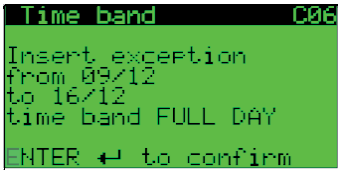


Select month using:



Select day using:

Enter period the exception applies to. The same screen can be used to set the type of opening and the corresponding energy band.

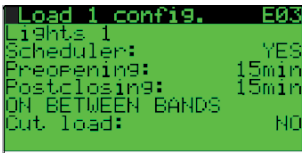


The calendar shows where the exceptions have been entered.

This screen shows the next exception and any additional exceptions.

5.5 Scheduler setting for each load

The controller manages a scheduler for each load, with an offset for activating and deactivating the load in question (for details see paragraph 8.1 "Scheduler").



Enable the load for scheduling, set the on/off offset and the behaviour between bands.

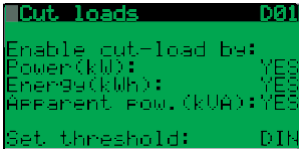
Note: if a load is not managed by the scheduler, the load is always on even when the system is off.

5.6 Load cut-off configuration

The controller features settable load cut-off thresholds.
Three types of load cut-off are available:

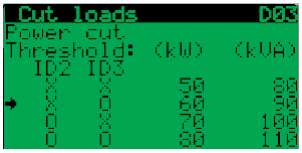
- energy threshold (kWh);
- power threshold (kW).
- apparent power threshold (kVA).

The effective load cut-off threshold is not the value set on the screens, but rather is adjusted by a settable offset, positive for power and apparent power, and negative for energy. To disable these offsets, simply set them to zero. For details on load cut-off operation, see paragraph 8.2.
The different thresholds can be loaded 'Automatically' or by 'Digital Input'; this depends on the type of the controller used: pLoads Large manages both options, 'Automatic' or 'Digital Input', while pLoads Compact only handles 'Automatic'. The digital inputs can only be used for selecting the Power and Apparent power thresholds. The different thresholds can be set on the following screens:



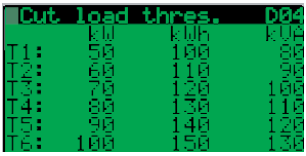
Both sizes of pLoads can enable load cut-off for the three measurements. Only on pLoads Large can 'DIN, Digital Input' be selected to change in threshold.

pLoads Large

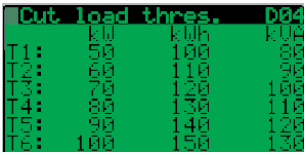


If Digital Input is enabled for managing the change in threshold, these inputs only apply to the change in threshold for Power and Apparent power. The Energy threshold is fixed and set on screen D05, where the monitoring time can also be set.

ID2 position	ID3 position	Threshold (parameter):
Closed	Closed	Row 1 (50 / 80)
Closed	Open	Row 2 (60 / 90)
Open	Closed	Row 3 (70 / 100)
Open	Open	Row 4 (80 / 110)

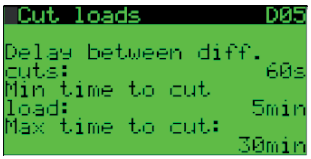


If Automatic management is enabled for changing the threshold, all three measurements are managed by the scheduler, and screen D05 only sets the energy monitoring time.



On pLoads Compact, the load cut-off thresholds are always managed by the scheduler and screen D05 only sets the energy monitoring time..

Below are the screens for setting the various load cut-off parameters:



Set the different load cut-off times. The times are common to all the loads managed by pLoads.

Set the safety offsets for Power, Energy and Apparent Power load cut-off. For Power and Apparent Power the percentage is only positive, while for Energy the percentage is only negative.

Per ogni carico è possibile abilitare il taglio carichi e la priorità di attivazione di esso (per dettagli funzionamento taglio carichi vedere il paragrafo 8.2).

Enable load cut-off and set the deactivation priority when load cut-off is required.

6. INPUT/OUTPUT TABLE

Digital outputs	pLoads Large	pLoads Compact
NO1	Load 1	Alarm
NO2	Load 2	Load 1
NO3	Load 3	Load 2
NO4	Load 4	Load 3
NO5	Load 5	Load 4
NO6	Load 6	Load cut-off active
NO7	Load 7	
NO8	Load 8	
NO9	Load 9	
NO10	Load 10	
NO11	Load 11	
NO12	Load 12	
NO13	Alarm	
NO14	Load cut-off active	
NO15		
NO16		
NO17		
NO18		

Tab. 6.a

Digital inputs	pLoads Large	pLoads Compact
ID1	Remote ON/OFF - Alarm	Pulse counter
ID2	Rate band 1	Manual load control
ID3	Rate band 2	
ID4	Manual load 1	
ID5	Manual load 2	
ID6	Manual load 3	
ID7	Manual load 4	
ID8	Manual load 5	
ID9	Manual load 6	
ID10	Manual load 7	
ID11	Manual load 8	
ID12	Manual load 9	
ID13	Manual load 10	
ID14	Manual load 11	
ID15	Manual load 12	
ID16	Manual load control	
ID17	Pulse counter (with PCO208DI00)	
ID18	Pulse counter (with PCO208DI00)	

Tab. 6.b

Analogue outputs	pLoads Large	pLoads Compact
Y1		
Y2		
Y3		
Y4		
Y5		
Y6		

Tab. 6.c

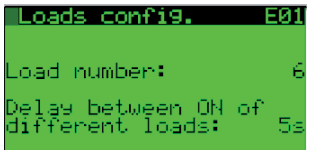
Analogue inputs	pLoads Large	pLoads Compact
B1	Generic input 1, (V-I)	Generic input 1, (V-I)
B2	Generic input 2, (V-I)	Generic input 2, (V-I)
B3	Generic input 3, (V-I)	Generic input 3, (V-I)
B4		
B5	Pulse counter	Manual load 1
B6	Generic input 4, (V-I)	Manual load 2
B7	Generic input 5, (V-I)	Manual load 3
B8	Generic input 6, (V-I)	Manual load 4
B9		
B10		

Tab. 6.d

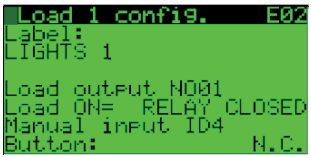
7. INSTALLER FUNCTIONS

7.1 Load installation

The controller features a digital input ('manual loads', see Tab. 6.b) used to notify the supervisor that one of the loads has been put in manual control, thus bypassing the controller logic. To enable this, the load and the manual switch will need to be connected, as shown in Fig. 7.h. If there is no connection to the corresponding digital input, there will be no feedback that one of the loads has been switched on/off without being managed by the controller. For each load, a manual input is also available ('manual load x', see Tab. 6.b and 6.d) that, on variation, changes the load status until the next request. To set the logic parameters for the load outputs and inputs, access the following screens:



Set the number of loads controlled and the delay between different load activations so as to avoid peaks in power.



A label can be set for each load; this is then copied to all the screens that regard that specific load. The load output logic and manual control input (button) can also be set.

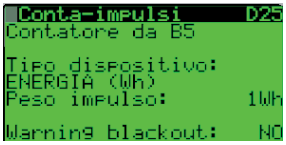
Note: the digital input reserved for 'Manual load X' will physically be a switch and not a button. pLoads will manage the transition of the switch OPEN>CLOSED and CLOSED>OPEN as a request to reverse load status at the moment the switch is operated. In this way, 'Manual load x' management bypasses the scheduler, load cut-off, etc.; for further details, see paragraph 8.4.

7.2 Pulse counter installation

The pulse generator device will have a digital output with transistor optocoupler, connected to the input as shown in the figure.

Fig. 7.a

Parameters can be set to adjust the weight of the pulse, the type of counter connected (energy, water, gas), reset the count and, where necessary, select an offset to be added if pulses are missed.



Select the type of meter connected to the pulse counter (energy, water or gas). Select the weight of the pulse and the blackout warning (to warn the user that the counter may have missed some pulses).

Type of controller	Max no. of pulse counter inputs	Remarks
pLoads Compact	5	1 built-in pulse counter (ID1)
		2 wireless pulse counters (CI, add. 31)
		2 wireless pulse counters (CI, add. 32)
pLoads Large	7	1 built-in pulse counter (B5)
		2 built-in pulse counters (ID17-ID18) with PCO208DI00 device
		2 wireless pulse counters (CI, add. 31)
		2 wireless pulse counters (CI, add. 32)

Important: as shown in the table, pLoads Compact features just one built-in pulse counter input. pLoads Large, on the other hand, can manage two more (built-in): ID17 and ID18 can in fact be used as pulse counter inputs only if they interface with the CAREL PCO208DIN00 device. This device foresees one pulse output for every eight inputs, therefore count is performed by pLoads applying a factor of 8. For details on the operation of this device, see the specific documents, +05003570. Below is a connection diagram for the PCO208DIN00 device to pLoads Large.

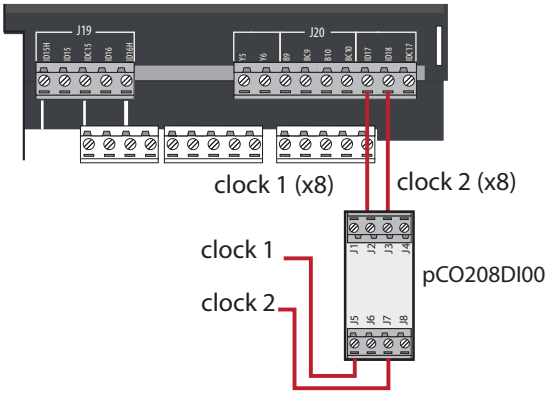


Fig. 7.b

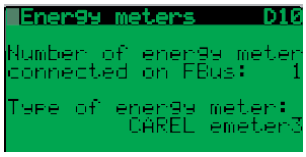
7.3 Energy meter installation

The controller can manage up to eight types of energy meter. pLoads can manage a maximum of 12 energy meters, and these must all be the same model. The following models can be selected on the user interface:

1. CAREL emeter3 (Carel P/N: MT300W1100);
2. Gavazzi CPT-DIN (basic);
3. Gavazzi WM14-DIN (basic);
4. Gavazzi WM14-96 (basic), select model 'Gavazzi CPT-DIN/WM14';
5. Ducati Energy Smart più;
6. IME Nemo 96 HD;
7. IME Nemo D4;
8. Electrex FEMTO D4;
9. Socomec (Diris A10).

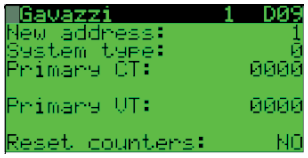
The serial address can be set for each energy meter. The following screens are used to set the Modbus® communication parameters with the energy meter:

Set the communication speed with the devices, stop bits, parity control and timeout for offline alarm.



Set the number of energy meters on the Modbus® line and the type.

Set the serial address for each energy meter.



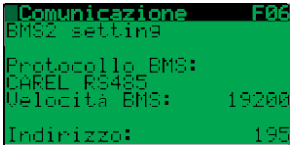
The main configuration parameters are displayed for each energy meter. For CAREL emeter3 and Gavazzi CPT-DIN, WM14-DIN and WM14-96 energy meters only, the device address can be set. In addition, the counters can be reset for the meters on the same screen.

For connection details, see the following paragraph.

7.4 Supervisor installation

pLoads can be connected to various supervisory systems, in particular the following BMS communication protocols can be used: Carel RS485 and Modbus®. Both protocols are supported by PlantVisor PRO models, available from version SP 2.0.2 Connection is via a BMS serial port, already fitted for both models of pLoads. The supervisor communication settings are as follows.

Supervisor BMS port 1 setting: the supervisor protocol, baud rate and device serial address can be set. These settings must be the same as on the supervisor.



Supervisor BMS port 2 setting: the supervisor protocol, baud rate and device serial address can be set. These settings are only available on pLoads Large.

pLoads Compact

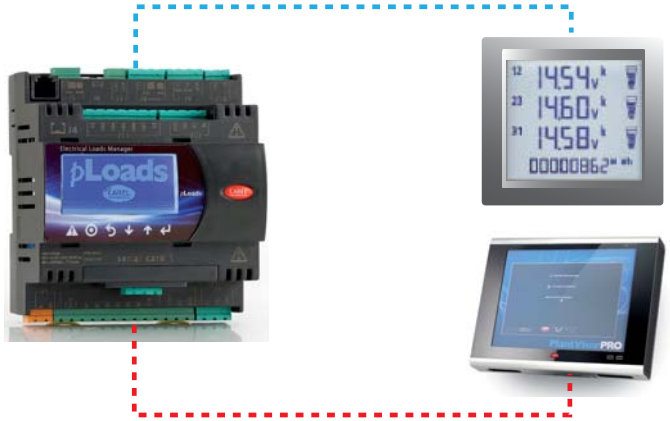


Fig. 7.c

Important:

- on pLoads Compact, to connect the controller to a supervisor, fit card PCOS004850 (standard) in the "Serial card 1" slot.
- port J8 is connected to the energy meter as per the instructions.

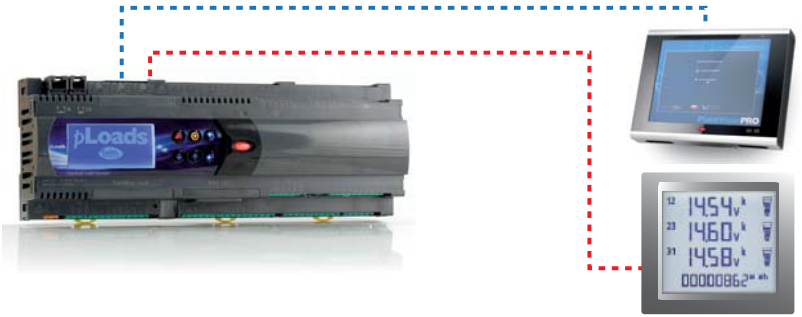


Fig. 7.d

Important:

- port J25 (BMS2) is connected to the Carel supervisor as per the instructions.
- port J26 (FBus2) is connected to the energy meter as per the instructions.

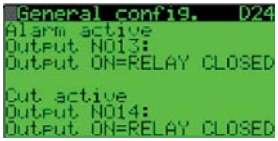
Note: on pLoads Large, serial BMS1 has been enabled where, using an optional supervisor card (not supplied as standard), pLoads can be connected to a second supervisory system. This is useful, for example, when wanting to install a pCOWeb card.

7.5 Installation of other devices

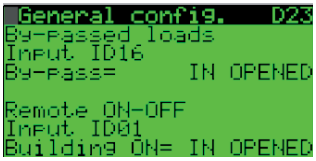
The controller can manage the installation of other devices, including:

1. Alarm relay;
2. Load cut-off in progress relay;
3. Remote ON-OFF/alarm input;
4. Current/Voltage reading inputs

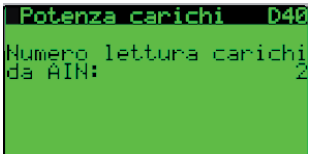
For details on the operation of these devices, see chap. 8, 'Operating logic'.
These devices must be connected following the device connection diagrams in paragraph 7.6.
The logic also needs to be configured for these devices, on the following screens:



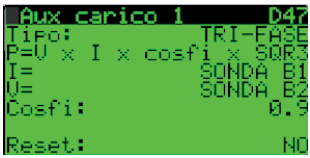
Set the logic for "load cut-off active" and "alarm active" digital outputs.



Set the logic for "loads bypassed" and remote ON-OFF digital inputs.



Depending on the model of pLoads, reading of some generic inputs can be enabled. This is used to read Current or Voltage values to measure the power consumption of a generic load when lower precision is possible. The following screens can then be used to set the type of sensor connected to the various inputs.

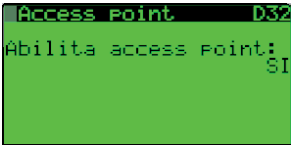


The auxiliary load can be monitored for Power and Energy. The Current reading is always the value measured by a sensor; the Voltage may be a parameter or the value read by a second sensor. The auxiliary load can be set as 'single-phase' or 'three-phase'. If 'three-phase', the Cos-fi value can be modified and will be considered when calculating the Power and Energy. The 'reset' function is used to reset the energy meter.

'Three-phase' load with voltage value settable by parameter.

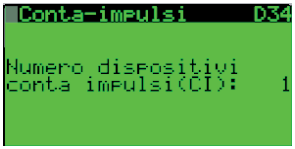
7.6 Wireless network installation

pLoads is perfectly integrated with the CAREL rTM wireless system. As can be seen in Fig. 3.a, the energy meter can be connected to pLoads via a Router Bridge. The network will therefore consist of an Access Point (with address 1) connected to the FieldBus serial port on the controller, and at least one Router Bridge with the corresponding energy meter connected via RS485; up to 2 CI pulse counters can also be used.

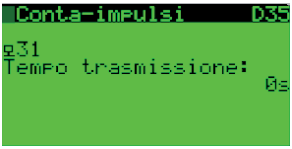


Enabling the Access Point configures pLoads to accept data from a Router Bridge and CI pulse counter.

The Access Point must always be enabled 'With Router Bridge', as shown in the figure. The Min address must be the lowest energy meter address connected to the Router Bridge; generally, address 2 is the first useful address for reading an energy meter over the serial line. The Max address will be the last serial address available on the network that pLoads will query; generally, this the last energy meter address available.



Set the number of CI pulse counters to read, up to 2. The addresses must be 31 and 32.



This screen can be used, only if the CI device is online, to modify the data transmission time. Remember that the lower the value, the shorter battery life will be.

The following screens, (D36, ...) are used to set the weight of the pulse for wireless devices, see paragraph 7.2. Remember that each CI pulse counter provides 2 fast inputs.

7.7 Description of the terminals

pLoads Compact

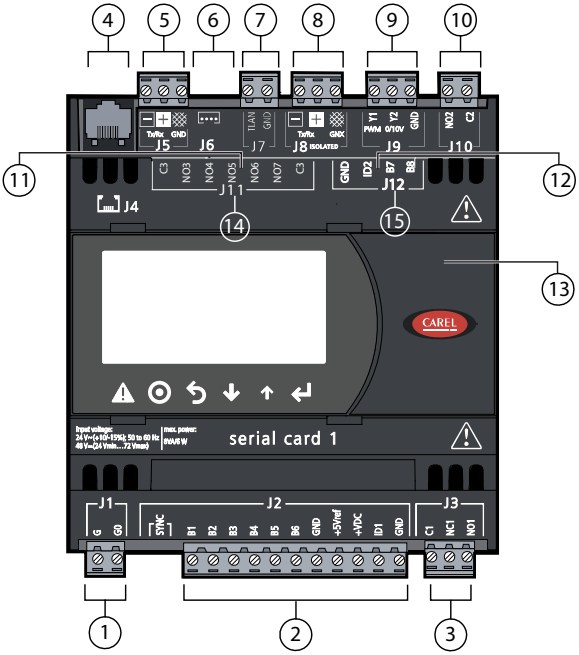


Fig. 7.e

Key:

1	power supply connector (G, G0) 24 Vac or 48 Vdc (36 Vdc min to 72 Vdc max)
2	"SYNC" synchronicity inputs for phase control and NTC, 0 to 1 V, 0 to 5 V, 0 to 20 mA, 4 to 20 mA analogue inputs, +5 Vref to supply 5 V ratiometric probes and +VDC (+21 Vdc) for active probes
3	digital output
4	connector for all standard pCO series terminals and for downloading the application program
5	pLAN network connector
6	connector for pLD terminals
7	tLAN network connector
8	optically-isolated "Field-Bus" serial connector
9	0 to 10 V analogue and PWM phase control outputs
10	digital output
11	digital outputs
12	NTC analogue inputs and digital inputs
13	removable cover for USB access
14	digital outputs (type B)
15	digital outputs (type B)

Tab. 7.e

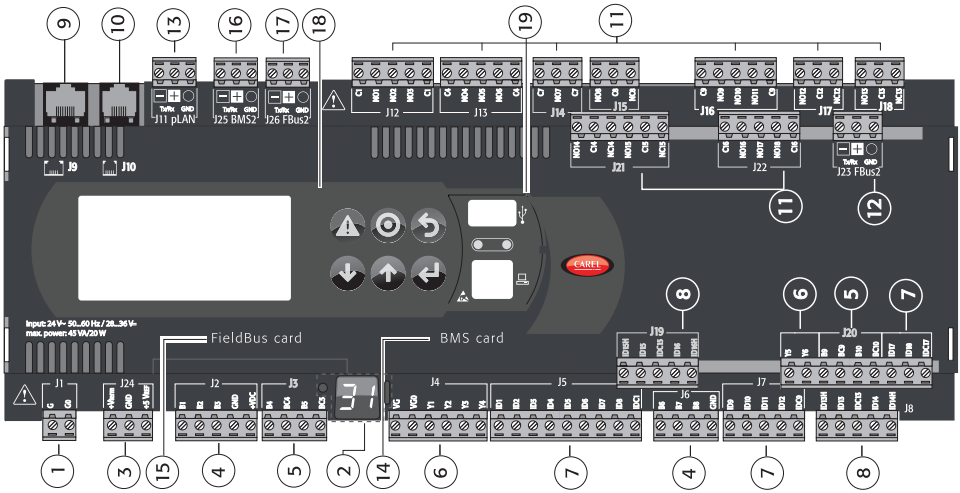


Fig. 7.f

Key:

1.	power supply connector [G (+), G0 (-)];
2.	pLAN address button, 7 segment display and LED (power on and +Vdc terminal overload);
3.	additional power supply for the terminal and 0 to 5 V ratiometric probes;
4.	universal analogue inputs, NTC, 0 to 1 V, 0 to 5 V ratiometric, 0 to 10 V, 0 to 20 mA, 4 to 20 mA;
5.	passive analogue inputs, NTC, PT1000, ON/OFF;
6.	0 to 10 V analogue outputs;
7.	24 Vac/Vdc digital inputs;
8.	230 Vac or 24 Vac/Vdc digital inputs;
9.	display terminal connector (external panel with direct signals);
10.	connector for all standard pCO series terminals and for downloading the application program;
11.	relay digital outputs;
12.	Fieldbus2 connector;
13.	pLAN network connector;
14.	cover for inserting the supervisor serial card option (BMS1);
15.	cover for inserting the field card option (Fieldbus1);
16.	BMS2 connector;
17.	Fieldbus2 connector;
18.	Built-In terminal (LCD, buttons and LEDs);
19.	USB Host and Slave connector
20.	electronic valve connector
21.	valve driver analogue and digital inputs
22.	external power supply from EVbat module

Tab. 7.f

7.8 Electrical connections

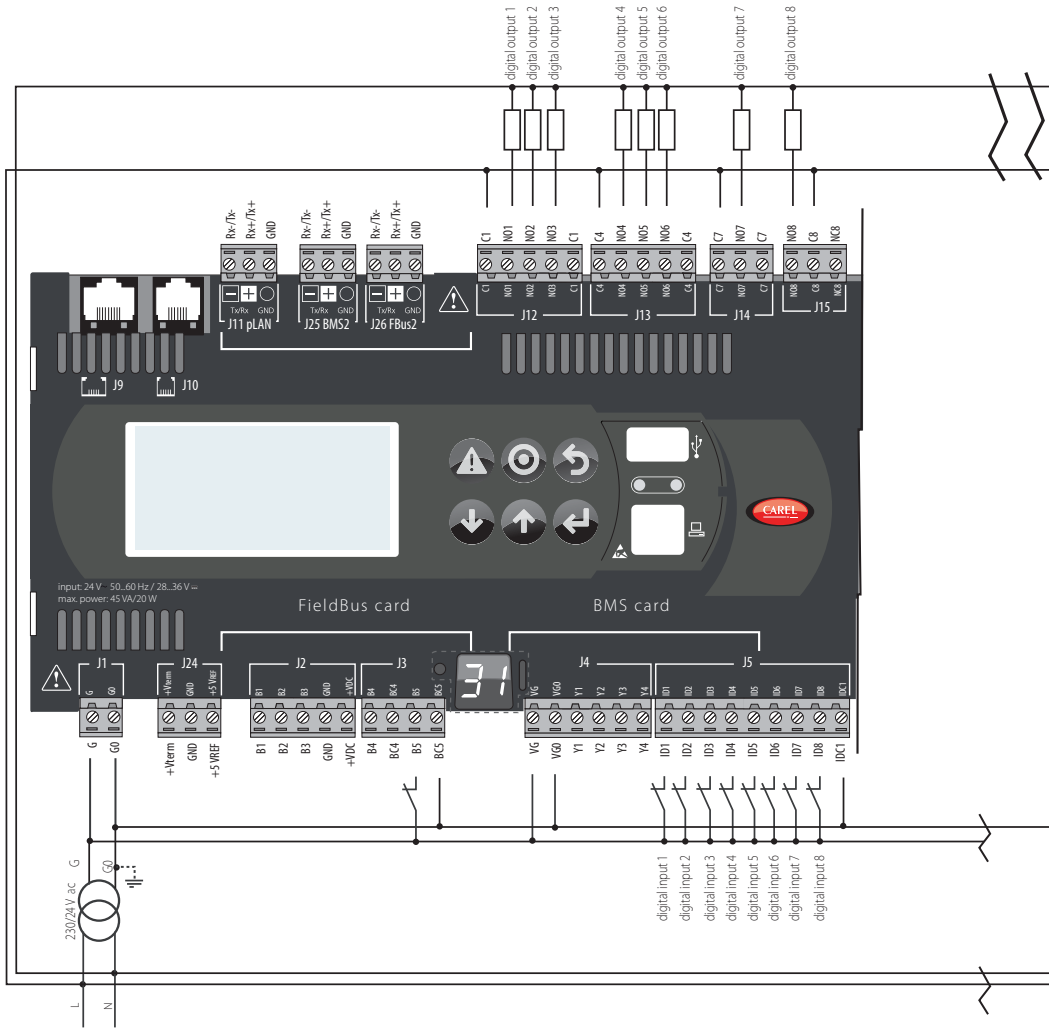
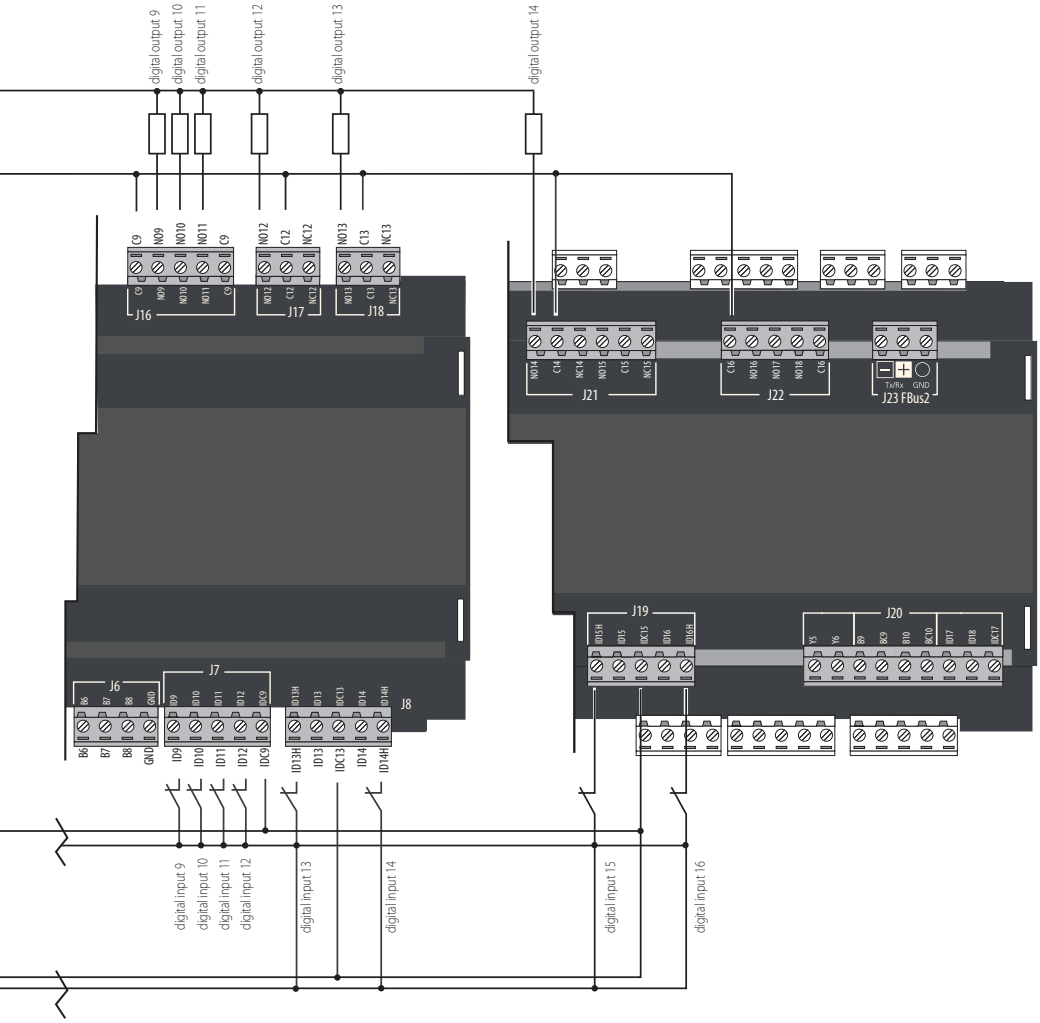


Fig. 7.g


digital output 9
digital output 10
digital output 11
digital output 12
digital output 13
digital output 14
C9
NO9
NO10
NO11
NO12
C12
NC12
NO13
C13
NC13
J16
J17
J18
NO14
C14
NC14
NO15
C15
NC15
C16
NO16
NO17
NO18
C16
J21
J22
Tx/Rx
GND
J23 FBus2
J19
ID15H
ID15
IDC15
ID16
ID16H
J20
Y5
Y6
B9
IDC9
B10
IDC10
ID17
ID18
IDC17
J6
B6
B7
B8
GND
J7
ID9
ID10
ID11
ID12
IDC9
ID13H
ID13
IDC13
ID14
ID14H
J8
digital input 9
digital input 10
digital input 11
digital input 12
digital input 13
digital input 14
digital input 15
digital input 16

Load connection example:

The diagram shown below highlights the connection to the 'bypassed loads' input ID16 for pLoads LARGE:

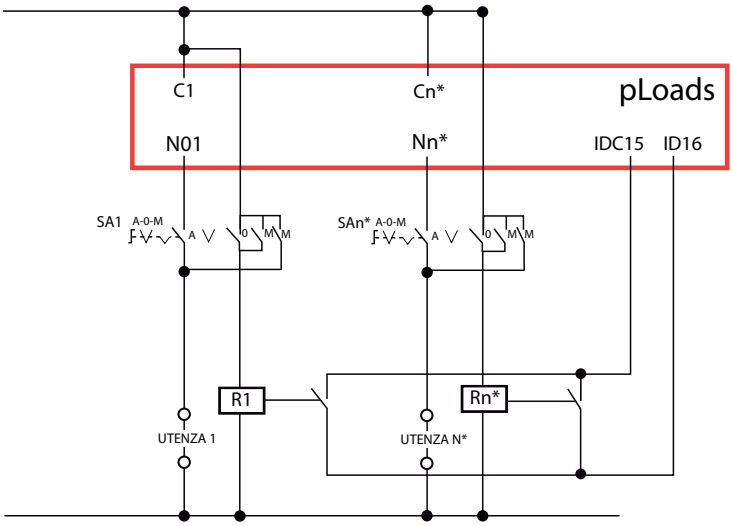


Fig. 7.h

Counter connection example on pLoads Large:

- ID2, ID3: select energy band input
- B5: pulse counter input

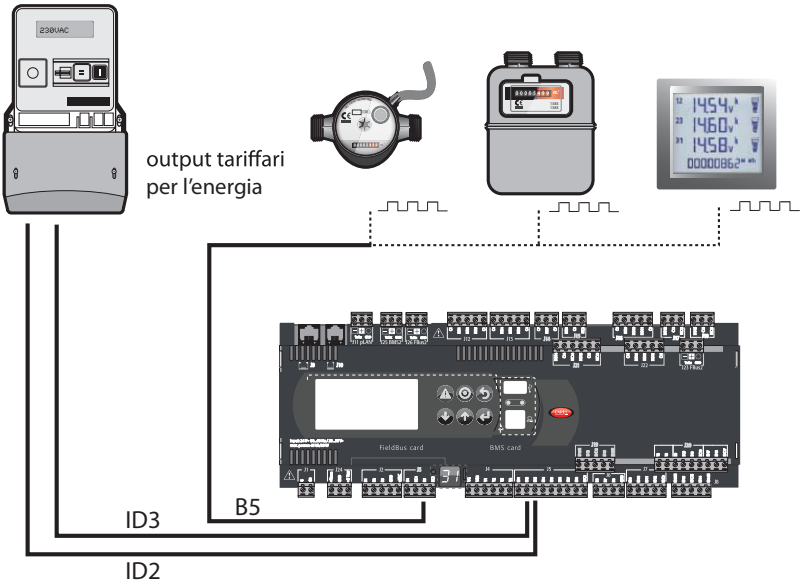


Fig. 7.i

8. OPERATING LOGIC

8.1 Scheduler

Under Settings ➔ Clock, the scheduler can be set for managing all the loads controlled by the scheduler.

Up to four types of time scheduling can be selected for each day of the week:
1. ORDINARY DAY;
2. SPECIAL DAY;
3. SHORT DAY;
4. CLOSING DAY.

For each type of time scheduling, an opening and closing time can be set in the morning and opening and closing time in the afternoon (except for Short Days, where only one daily band is managed). During the closing days no loads will be activated by the scheduler. The scheduler is only enabled when the system is on.

Exceptions can be set to the daily scheduler. Up to 15 exception periods can be set, selecting the following options:
- first day/month of the exception;
- last day/month of the exception;
- type of day the controller will apply during the period;
- type of energy band exception (if from scheduler).

Note: exceptions are cyclical and therefore will be repeated every year until they are replaced or cancelled.

Load scheduler

Under Settings ➔ Load configuration, the behaviour of each individual load as regards the general scheduler can be set. The scheduler can be enabled or disabled and if enabled, before-opening, after-closing and behaviour of the load between morning and afternoon times can all be set.
Load before-opening and after-closing operation can be set with values ranging from 0 to 120 minutes.
During the scheduled time bands, three types of load operation can be selected:
1. BEFORE-AFTER BETWEEN TIME BANDS (the load will observe the after-closing and the pre opening during the pause);
2. ALWAYS OFF BETWEEN TIME BANDS (the load will switch off immediately at the end of the load activation time band);
3. ALWAYS ON BETWEEN TIME BANDS (the load will remain on until deactivation is next requested by a time band).

Note: to disable a specific time band, set the same start and end times. This also allows an additional short day to be created. The before-opening and after-closing times are ignored if the time band is disabled.

Note: a before-opening operation that requires activation of the load on the previous day will be ignored. The load cannot be activated before midnight.

Note: an after-closing operation that requires deactivation of the load the following day will be applied.

Below is an example of load operation:
Morning opening – closing times: 8:00 - 12:00
Afternoon opening – closing times: 14:00 - 18:30

	Before-opening	After-closing	Behaviour between bands
Load 1	30 minutes	60 minutes	BEFORE-AFTER between bands
Load 2	0 minutes	30 minutes	ON between time bands
Load 3	30 minutes	30 minutes	OFF between time bands

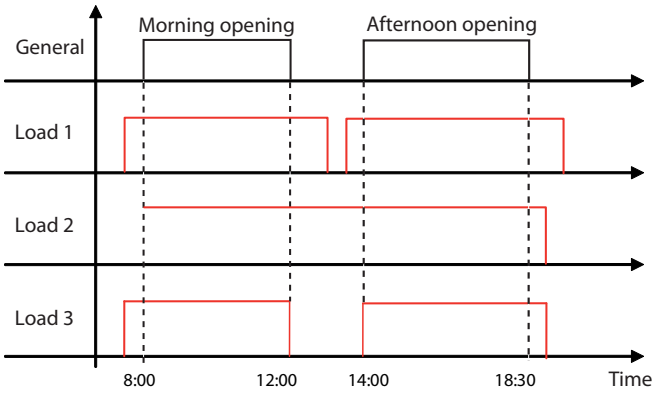


Fig. 8.a

8.2 Load cut-off

Load cut-off is only active when an energy meter is connected to the Field-Bus port on the controller. Power/energy control is not available with a pulse counter or the analogue inputs reserved for reading Current/Voltage (see par. 7.5). The energy meter must be connected as "general" in the system structure (see par. 7.3). With reference to paragraph 5.6, remember that pLoads deactivates loads based on the following measurements:

- Energy (kWh)
- Power (kW)
- Apparent Power (kVA)

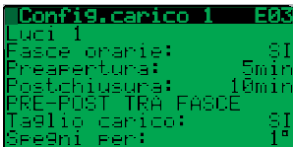
Load cut-off times can be set and applied to any type of load cut-off, in particular:

- Delay between cutting off different loads;
- Minimum load cut-off time;
- Maximum load cut-off time.

Note: the delay between "cutting off different loads" applies to both deactivation and activation.

Note: rotation applied between the loads is LIFO (Last In First Out) and cannot be modified.

For each load, load cut-off can be enabled and the priority set. The load with the highest priority will be the first switched off when a load cut-off is required. Subsequently, if other loads need to be disconnected, the other loads will be cut off in order of lower priority. When the load cut-off request is no longer active, the controller will reactivate the loads again in order of priority.



For each enabled load, the following settings are available:
- enable scheduler
- set a before-opening time
- set an after-closing time
- set behaviour between time bands
- enable load cut-off
- set the load cut-off priority

Below is an example of load cut-off:

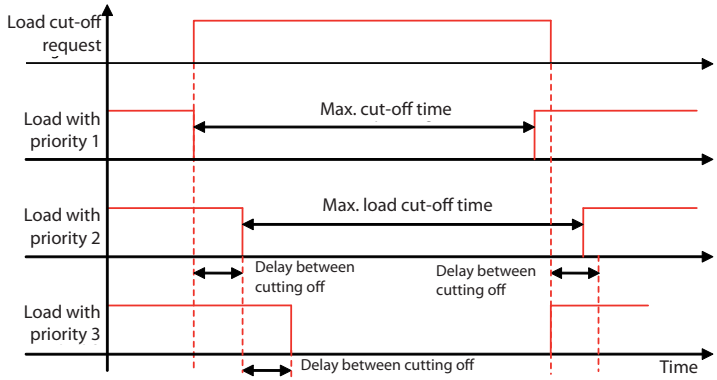


Fig. 8.b

The graph shows how the loads switch off in order of priority, from the highest (load with priority 1) to the lowest (load with priority 3).
After the maximum load cut-off time, the load with priority 1 will switch on again even if the load cut-off request is still active.
Once the request is no longer active, the first load to switch on is the one with the lowest priority. The load with priority 2 will switch on without observing the delay between cutting off different loads as the maximum load cut-off time has elapsed.

Load cut-off by Power and Apparent Power

Under Settings ➔ General configuration, different power cut-off thresholds can be set (see paragraph 5.5).
The table below summarises the possible configurations:

Type of controller	Load cut-off by:	Threshold selection:
pLoads Compact	• Power (kW)	• AUTO (6 thresholds)
	• Energy (kWh)	
	• Apparent power (kVA)	
pLoads Large	• Power (kW)	• AUTO (6 thresholds)
	• Energy (kWh)	• DIN (4 thresholds)
	• Apparent power (kVA)	

On pLoads Large, load cut-off can be configured with the following settings:
- Digital input (4 possible thresholds)
- Automatic (6 possible thresholds)

2 digital inputs are available for selection with binary logic.

On pLoads Compact, the thresholds can only be selected with the scheduler, and there is just one power threshold. Based on this power threshold and the safety offset on power cut-off (positive only), the loads enabled for load cut-off will be switched off. Below is an example of load cut-off by power:

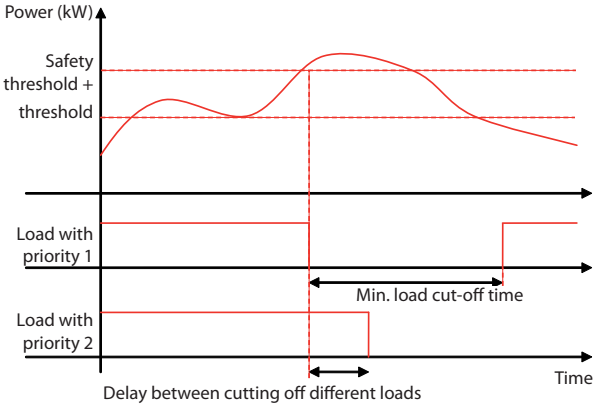


Fig. 8.c

Load cut-off by energy

Under Settings ➔ General configuration, the energy threshold and the monitoring time for energy can be set (see paragraph 5.5). The controller will record the energy values sent by the general meter, according to the energy "monitoring time" parameter. If between the last energy value read and the energy value recorded over the previous minutes (determined by the energy monitoring time), energy consumption is higher than the energy threshold calculated, the load will be cut off. Below is an example of load cut-off by energy:

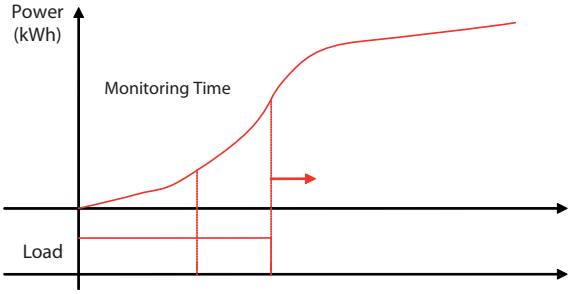


Fig. 8.d

Load cut-off active function

The controller features the load cut-off active function (see the corresponding digital output in Tab. 6.a). When the controller is cutting off loads or the load cut-off conditions are true (so even when no load is enabled to be cut off), the "Load cut-off active" digital output will be activated. The system installer can connect this digital output to an input on an external power generator to signal greater demand.

Note: if the energy meter is offline, all types of load cut-off functions are disabled.

8.3 Override loads

Override from manual input

For each load connected to the controller, a digital input is available for enabling manual control by button. When the user operates the switch, load status will be reversed (if off it will be switched on, or if on it will be switched off). The load only temporarily reverses status, i.e. until the next ON/OFF request is received from the scheduler, supervisor, load cut-off or the digital input itself. The following pages describe how these different requests interact with one another.

Override from supervisor

For each load connected to the controller, a supervisor command is available for switching the load on or off.

Fig. 8.g

From the supervisor, each load can be switched MAN-ON, MAN-OFF or left in AUTO operation

Note: if the supervisor is offline, the load will remain in the status set by the supervisor.

Note: in the event of a power failure on pLoads, the command sent previously by the supervisor will be reset when the device starts again. To return the load to the previous status, the supervisor needs to send the command again.

8.4 Control interaction

After having analysed the different requests that affect a load, the interactions between these and the different priorities are illustrated below.

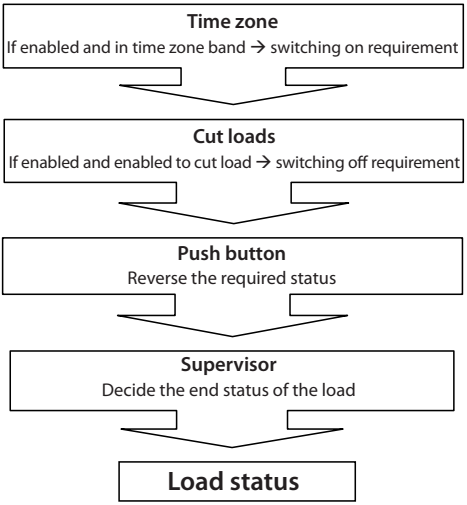


Fig. 8.e

Example of how the requests interact to determine load status:

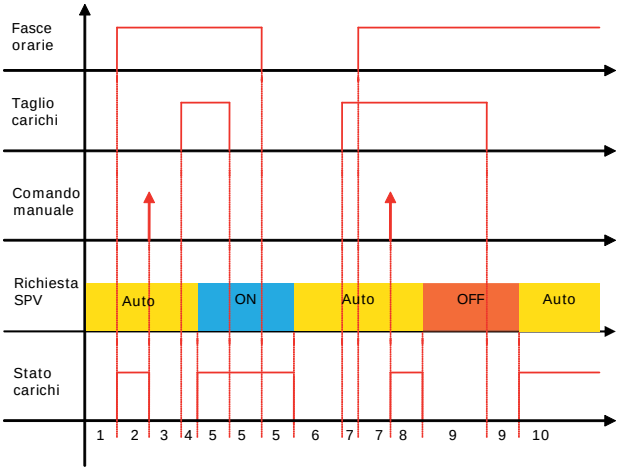


Fig. 8.f

Key:

1 = load OFF;
2 = load ON by time zone;
3 = load OFF by manual mode;
4 = load OFF by cut-load;
5 = load ON by supervisor;
6 = load OFF by time zone;
7 = load OFF by cut-load;
8 = load ON by manual mode;
9 = load OFF by supervisor;
10 = load ON by time zone.

9. PARAMETERS TABLE

"Mask index": indicates the unique address of each screen and consequently the path needed to reach the parameters available on this screen; for example, to reach the parameters corresponding to the suction pressure probe with mask index Bab01, proceed as follows:

Main menù I/O B. In./Out.→a. Status→b. Analog. in.

Below is the table of the parameters that can be displayed on the terminal. The values indicated with '---' are not Significant or are not set, while the values indicated with '…' may vary according to the configuration, with the possible options visible on the user terminal. A row of '…' means that there are a series of parameters Similar to the previous ones.

Note:Not all the screens and parameters shown in the table are always visible or can be set, the screens and parameters that are visible or can be set depend on the configuration and the access level.

Mask index	Display description	Description	Def.	UOM	Values
Main screen					
Main screen for pLoads large (display only)	pLoads	The name of the product	---	---	---
	---	Hours ,minutes and date	---	---	---
	---	Weekday (Monday to Sunday)	---	---	---
	---	Weekday type (Full, Reduce, Special, Closing day)	---	---	---
	---	Energy	---	kWh	---
	---	Power	---	Kw…	---
	Power percentage:	Power percentage	---	%	Power / App. power / emeter
	---	Unit status (with unit OFF)	---	---	Unit OFF by DIN Unit Off from keypad
	Load status	Read the status of loads	---	---	---
		Load 1 status (if enable)	---	---	0… 7
	---	Load 2 status (if enable)	---	---	0… 7
	---	Load 3 status (if enable)	---	---	0… 7
	---	Load 4 status (if enable)	---	---	0… 7
		Load 5 status (if enable)	---	---	0… 7
	---	Load 6 status (if enable)	---	---	0… 7
	---	Load 7 status (if enable)	---	---	0… 7
	---	Load 8 status (if enable)	---	---	0… 7
		Load 9 status (if enable)	---	---	0… 7
	---	Load 10 status (if enable)	---	---	0… 7
	---	Load 11 status (if enable)	---	---	0… 7
	---	Load 12 status (if enable)	---	---	0… 7
Main screen for pLoads compact (display only)	pLoads	The name of the product	---	---	---
	---	Hours ,minutes and date	---	---	---
	---	Weekday (Monday to Sunday)	---	---	---
	---	Weekday type (Full, Reduce, Special, Closing day)	---	---	---
	---	Energy	---	kWh	---
	---	Power	---	Kw…	---
	Power percentage:	Power percentage	---	%	---
	---	Unit status (with unit OFF)	---	---	Unit OFF by DIN Unit Off from keypad
	Load status	Read the status of loads	---	---	…
		Load 1 status (if enable)	---	---	0… 7
	---	Load 2 status (if enable)	---	---	0… 7
	---	Load 3 status (if enable)	---	---	0… 7
	---	Load 4 status (if enable)	---	---	0… 7

Mask index	Display description	Description	Def.	UOM	Values
A. General ON-OFF					
A01	---	Unit status	---	---	Building ON OFF by keyboard OFF by input

Mask index	Display Description	Description	Def.	UOM	Values
B.Unit status (the I/Os available depend on the selected configuration, the following are just some examples.)					
B01(Read only)	---	The label of load 1	0	---	See NOTE 1
	---	Manual digital input (pCO5 - ID4, pCO compact - B5)	---	---	0: Manual input ID4: 1: Manual input B5:
	---	Status of digital manual load 1	---	---	Closed / Open
		Load output (pCO5 - NO1, pCO compact - NO2)	---	---	0: Load output NO01: 1: Load output NO02:
	---	Status of load 1	…	…	See NOTE 2
B02 (Read only)	---	The label of load 2	7	---	See NOTE 1
	---	Manual digital input (pCO5 - ID5, pCO compact – B6)	---	---	0: Manual input ID5: 1: Manual input B6:
		Status of digital manual load 2	---	---	Closed / Open
		Load output (pCO5 – NO2, pCO compact – NO3)	---	---	0: Load output NO02: 1: Load output NO03:
	…	Status of load 2	…	…	See NOTE 2
B03 (Read only)	---	The label of load 3	13	---	See NOTE 1
	---	Manual digital input (pCO5 - ID6, pCO compact – B7)	---	---	0: Manual input ID6: 1: Manual input B7:
		Status of digital manual load 3	---	---	Closed / Open
		Load output (pCO5 – NO3, pCO compact – NO4)	---	---	0: Load output NO03: 1: Load output NO04:
	…	Status of load 3	…	…	See NOTE 2
B04 (Read only)	---	The label of load 4	16	---	See NOTE 1
	---	Manual digital input (pCO5 - ID7, pCO compact – B8)	---	---	0: Manual input ID7: 1: Manual input B8:
		Status of digital manual load 4	---	---	Closed / Open
		Load output (pCO5 – NO4, pCO compact – NO5)	---	---	0: Load output NO04: 1: Load output NO05:
	…	Status of load 4	…	…	See NOTE 2
…	…	…	…	…	…
B13 (Only pCO5 large can read)	Remote ON-OFF ID01:	Status of digital input remote ON-OFF		---	OFF/ ON
	Band1 input ID02:	IN 1 for band of energy/power	---	---	OFF/ ON
	Band2 input ID03:	IN 2 for band of energy/power	---	---	OFF/ ON
B14 (Read only)	---	pLoads bypassed (pCO5 – ID16, pCO compact – ID2)			0: pLoads bypassed ID02: 1: pLoads bypassed ID16:
	---	Status of digital input load by-passed	---	---	Closed / Open
B15 (Read only)	---	Alarm output (pCO5 – NO13, pCO compact – NO1)	---	---	0: Alarm NO1: 1: Alarm NO13:
	---	General alarm status	---	---	Closed / Open
	---	Cut active output (pCO5 – NO14, pCO compact – NO6)		---	0: Cut active NO6: 1: Cut active NO14:
	---	Cut active status	---		Closed / Open
B16 (Read only, if enable)	---	Enery meter 1 type	---	---	See NOTE 3
	---	Energy meter 1 address	---	---	2... 13
	Voltages (V) L1-L2:	Energy meter 1, Voltage L1-L2	---	V	0... 9999
	L2-L3:	Energy meter 1, Voltage L2-L3	---	V	0... 9999
	L3-L1:	Energy meter 1, Voltage L3-L1	---	V	0... 9999
	Average:	Energy meter 1, Phase-phase average voltage	---	V	0... 9999
	Frequency (Hz):	Energy meter 1, Frequency	---	Hz	0... 999.9
B17 (Read only, if enable)	---	Enery meter 1 type	---	---	See NOTE 3
	---	Energy meter 1 address	---	---	2... 13
	Voltages (V) Neutral-L1:	Energy meter 1, Voltage L1	---	V	0... 9999
	L2-L3:	Energy meter 1, Voltage L2	---	V	0... 9999
	L3-L1:	Energy meter 1, Voltage L3	---	V	0... 9999
B18 (Read only, if enable)	---	Enery meter 1 type	---	---	See NOTE 3
	---	Energy meter 1 address	---	---	2... 13
	Current (A) Line 1:	Energy meter 1 (Building consumption), Current line 1	---	A	0… 999.9
	Line 2:	Energy meter 1 (Building consumption), Current line 2	---	A	0… 999.9
	Line 3:	Energy meter 1 (Building consumption), Current line 3	---	A	0… 999.9
	Power factor:	Power factor part 1	---	---	0... 9
		Power factor part 2	---	---	0... 99

B19 (Read only, if enable)	---	Enery meter 1 type	---	---	See NOTE 3
	---	Energy meter 1 address	---	---	2... 13
	Reactive power (kVAr) Phase 1:	Reactive power 1	---	kVAr	0... 999.9
	Phase 2:	Reactive power 2	---	kVAr	0... 999.9
	Phase 3:	Reactive power 3	---	kVAr	0... 999.9
	Reactive energy eq.:	Reactive energy high part	---	---	0... 9999
		Reactive energy middle part	---	---	0... 999
		Reactive energy low part	---	---	0... 999
	---	Energy meter is reading in MWh	---	---	0: kVArh 1: MVArh
B20 (Read only, if enable)	---	Enery meter 1 type	---	---	
	---	Energy meter 1 address	---	---	2... 13
	Power (kW) Phase 1:	Power 1	---	kW	0... 999.9
	Phase 2:	Power 2	---	kW	0... 999.9
	Phase 3:	Power 3	---	kW	0... 999.9
	Total:	Energy meter 1 (Building consumption), Equivalent power	---	kW	0...999.9
	Energy:	Energy value high part	---	kWh	0...9999
		Energy value middle part	---	kWh	0...999
		Energy value low part	---	kWh	0...999
	---	Energy meter is reading in MWh	---	---	0: kVArh 1: MVArh
B21 (Read only, if enable)	---	Enery meter 2 type	---	---	See NOTE 3
	---	Energy meter 2 address	---	---	2... 13
	Voltages (V) L1-L2:	Energy meter 2, Voltage L1-L2	---	V	0... 9999
	L2-L3:	Energy meter 2, Voltage L2-L3	---	V	0... 9999
	L3-L1:	Energy meter 2, Voltage L3-L1	---	V	0... 9999
	Average:	Energy meter 2, Phase-phase average voltage	---	V	0... 9999
	Frequency (Hz):	Energy meter 2, Frequency	---	Hz	0... 999.9
B22 (Read only, if enable)	---	Enery meter 2 type	---	---	See NOTE 3
	---	Energy meter 2 address	---	---	2... 13
	Voltages (V) Neutral-L1:	Energy meter 2, Voltage L1	---	V	0... 9999
	L2-L3:	Energy meter 2, Voltage L2	---	V	0... 9999
	L3-L1:	Energy meter 2, Voltage L3	---	V	0... 9999
B23 (Read only, if enable)	---	Enery meter 2 type	---	---	See NOTE 3
	---	Energy meter 2 address	---	---	2... 13
	Current (A) Line 1:	Energy meter 2, Current line 1	---	A	0... 999.9
	Line 2:	Energy meter 2, Current line 2	---	A	0... 999.9
	Line 3:	Energy meter 2, Current line 3	---	A	0... 999.9
	Power factor:	Power factor part 1	---	---	0... 9
	...	Power factor part 2	---	---	0... 99
B24 (Read only, if enable)	---	Enery meter 2 type	---	---	See NOTE 3
	---	Energy meter 2 address	---	---	2... 13
	Reactive power (kVAr) Phase 1:	Reactive power 1	---	kVAr	0... 999.9
	Phase 2:	Reactive power 2	---	kVAr	0... 999.9
	Phase 3:	Reactive power 3	---	kVAr	0... 999.9
	Reactive energy eq.:	Reactive energy high part	---	---	0... 9999
	---	Reactive energy middle part	---	---	0... 999
		Reactive energy low part	---	---	0... 999
	---	Energy meter is reading in MWh	---	---	0: kVArh 1: MVArh
B25 (Read only, if enable)	---	Enery meter 2 type	---	---	See NOTE 3
	---	Energy meter 2 address	---	---	2... 13
	Power (kW) Phase 1:	Power 1	---	kW	0... 999.9
	Phase 2:	Power 2	---	kW	0... 999.9
	Phase 3:	Power 3	---	kW	0... 999.9
	Total:	Energy meter 1 (Building consumption), Equivalent power	---	kW	0...999.9
	Energy:	Energy value high part	---	kWh	0...9999
		Energy value middle part	---	kWh	0...999
		Energy value low part	---	kWh	0...999
		Energy meter is reading in MWh	---	---	0: kVArh 1: MVArh
...	...	...	...	...	...

B85	Nº	Number of alarm history	---	---	0...999
		Show time and date of the alarm	---	---	
		Alarm index	---	---	0...999
		Alarm description	---	---	
B76 (Read only, if enable)	---	Phase type load 1	---		0: (1-phase load with 1: (3-phases load with
	---	Voltage 1 visible	---		0: AIN voltage value) 1: fix voltage value)
	Voltage:	Voltage load 1	---	V	0...999.0
	Current:	Current load 1	---	A	0...999.9
	Power:	Power load 1	--	kW	0...999.9
	Energy:	Energy medium part	---	kWh	0...999
		Energy low part	---	kWh	0...999
B77 (Read only, if enable)	---	Phase type load 2	---		0: (1-phase load with 1: (3-phases load with
	---	Voltage 2 visible	---		0: AIN voltage value) 1: fix voltage value)
	Voltage:	Voltage load 2	---	V	0...999.0
	Current:	Current load 2	---	A	0...999.9
	Power:	Power load 2	--	kW	0...999.9
	Energy:	Energy medium part	---	kWh	0...999
		Energy low part	---	kWh	0...999
...	...	…	...	...	…
B82 (Read only)	---	Pusle counter from (pCO5 – ID1, pCO compact – B5)	---	---	0: Counter from ID1 1: Counter from B5
	Total:	Totally pulse counter digital 0	---	---	0…9
		Totally pulse counter digital 1	---	---	0…9
		Totally pulse counter digital 2	---	---	0…9
		Totally pulse counter digital 3	---	---	0…9
		Totally pulse counter digital 4	---	---	0…9
		Totally pulse counter digital 5	---	---	0…9
		Totally pulse counter digital 6	---	---	0…9
		Totally pulse counter digital 7	---	---	0…9
		Totally pulse counter digital 8	---	---	0…9
		Totally pulse counter digital 9	---	---	0…9
		Totally pulse counter digital 10	---	---	0…9
		Totally pulse counter digital 11	---	---	0…9
		Totally pulse counter digital 12	---	---	0…9
		Totally pulse counter digital 13	---	---	0…9
		Totally pulse counter digital 14	---	---	0…9
		Totally pulse counter digital 15	---	---	0…9
	---	Type device (0: Energy; 1: Water; 2: Gas)	---	---	0: Wh 1: l 2: m^3
	Frequency:	Frequency of the pulse counter	---	Hz	0…16384
…	…	…	…	…	…
B89 (Read only, if enable wireless sensor)	Press Enter to see the wireless information	---	---	---	---
B90 (Read only)	Access point	Address of access point	1	---	1
	Firmware version:	Firmware version of access point	---	---	
	AP Trasmi.power:	Transmit power of access point	---	---	
	Radio signal lev.:	Signal level	---	---	
B91 (Read only)	Access point	Address of access point	1	---	1
	Num.of connected units(online units)	Connected units with access point online	---	---	0...112
	Num.of units connected access point:	Connected units with access point	---	---	0...32
	Num.of units connected through RB-device:	Number of units connected with router bridge	---	---	0...255
B92 (Read only)	Access point	Address of access point	1	---	1
	Number of router in network:	Number of router bridge in the netwrok	---	---	0...32767
	Number of router nearby:	Number of router nearby	---	---	0...16
	Num.of router nearby with good connect.:	Number of router nearby with good connection	---	---	0...16

B93 (Read only)	CI device	Address of pulse counter	31	---	31...32
	Firmware version:	Firmware version of pulse counter	---	---	
	Dip-switch value:	DIP switch value	---	---	16...127
	Radio signal:	Radio signal with access point	---	---	1...4
	Battery level:	Battery level of pulse counter	---	---	1...4
B94 (Read only)	CI device	Address of pulse counter	32	---	31...32
	Digital input 1 status:	Status of digital input 1	---	---	0...1
	Digital input 2 status:	Status of digital input 2	---	---	0...1
...	...	...	...	...	...

Mask index	Display description	Description	Def.	UOM	Values
C.Clock					
C01	Day:	Weekday (Monday to Sunday)	---	---	0: *** 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday
	Date format:	Date format showing on the main mask	1	---	1: DD/MM/YY 2: MM/DD/YY 3: YY.MM.DD
	Date:	Set the new date - day	---	---	0...31
		Set the new date - month	---	---	0...12
		Set the new date - year	---	---	0...99
	Hour:	Set the new time - hour	---	---	0...23
		Set the new time - minute	---	---	0...59
C02	DST:	Activates the module algorithm	1	---	0: DISABLE 1: ENABLE
	Start:	Start weekly in one month	0	---	0: LAST 1: FIRST 2: SECOND 3: THIRD 4: FOURTH
		Start day in one week	0	---	0: *** 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday
	in	Start month	0	---	0: *** 1: JANUARY 2: FEBRUARY 3: MARCH 4: APRIL 5: MAY 6: JUNE 7: JULY 8: AUGUST 9: SEPTEMBER 10: OCTOBER 11: NOVERMBER 12: DECEMBER
		Start hour	0	---	0...23
	End:	End weekly in one month	0	---	0: LAST 1: FIRST 2: SECOND 3: THIRD 4: FOURTH
		End day in one week	0	---	0: *** 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday

	In	End month	0	---	0: *** 1: JANUARY 2: FEBRUARY 3: MARCH 4: APRIL 5: MAY 6: JUNE 7: JULY 8: AUGUST 9: SEPTEMBER 10: OCTOBER 11: NOVERMBER 12: DECEMBER
		End hour	0	---	0...23
C03	Full day	Starting of Time Band 1, full day 1	8	H	0...23
		Starting of Time Band 1, full day 1	0	M	0...59
		Ending of Time Band 1, full day 1	13	H	0...23
		Ending of Time Band 1, full day 1	0	M	0...59
		Starting of Time Band 2, full day 1	14	H	0...23
		Starting of Time Band 2, full day 1	0	M	0...59
		Ending of Time Band 2, full day 1	18	H	0...23
		Ending of Time Band 2, full day 1	0	M	0...59
	Special day	Starting of Time Band 1, full day 2	9	H	0...23
		Starting of Time Band 1, full day 2	0	M	0...59
		Ending of Time Band 1, full day 2	13	H	0...23
		Ending of Time Band 1, full day 2	0	M	0...59
		Starting of Time Band 2, full day 2	14	H	0...23
		Starting of Time Band 2, full day 2	0	M	0...59
		Ending of Time Band 2, full day 2	16	H	0...23
		Ending of Time Band 2, full day 2	0	M	0...59
	Reduce day	Starting, reduce day 1	9	H	0...23
		Starting, reduce day 1	0	M	0...59
		Ending reduced day 1	17	H	0...23
		Ending reduced day 1	0	M	0...59
C04	Monday:	Type scheduler Monday	0	---	0...3
	Tuesday:	Type scheduler Tuesday	0	---	0...3
	Wednesday:	Type scheduler Wednesday	1	---	0...3
	Thursday:	Type scheduler Thursday	0	---	0...3
	Friday:	Type scheduler Friday	0	---	0...3
	Saturday:	Type scheduler Saturday	2	---	0...3
	Sunday:	Type scheduler Sunday	3	---	0...3
C05	---	Exceptions present	---	---	0: No exceptions 1: Next exception
	---	Next event present day and month	---	---	0...31 0…12
	---	Type of period for next exception	---	---	0...3
C05 (If enable set exception)	---	Set month	0	---	1...12
	---	Read year	---	---	0...99
	---	Set start day	---	---	0: Do not set 1: Set
	---	Set end day	---	---	0: Do not set 1: Set
	---	Set period finish	---	---	0: 1: END PERIODS!!
C06	Inset exception from	Set start day	---	---	0...31
		Set start month	---	---	0...12
	to	Set end day	---	---	0...31
		Set end month	---	---	0...12
	time band	Type of special period	0	---	0: FULL DAY 1: SPCIAL DAY 2: REDUCE DAY 3: CLOSING DAY
	---	Enter to confirm	---	---	---

Mask index	Display description	Description	Def.	UOM	Values
D. General config. (The I/Os available depend on the selected configuration, the following are just some examples)					
D01 (Only for pCO5 large and enable)	Power cut Threshold (kW) ID2 ID3	Threshold 0 of general power for start the cut	0	kW	0...32767
	X X				
	X 0	Threshold 1 of general power for start the cut	0	kW	0...32767
	0 X	Threshold 2 of general power for start the cut	0	kW	0...32767
	0 0	Threshold 3 of general power for start the cut	0	kW	0...32767
D02 (Only for pCO compact and enable)	Cut power Threshold:	Threshold of general power for start the cut	0	kW	0...32767
D03 (if enable)	Energy cut Threshold:	Threshold to cut the loads for energy	0	kWh	0...32767
	Time check:	Time to check the energy	15	min	1...60
D04 (if enable)	Safety to cut based on power:	Percentage to cut loads for power	30	%	1...100
	Safety to cut based on energy:	Percentage to cut loads for energy	1	%	1...100
D05 (if enable)	Delay between diff. cuts:	Delay between different cut	1	s	0...999
	Min time to cut load:	Minimum time for cut a load	0	min	0...500
	Max time to cut:	Maximum time that the load is forced OFF	0	min	0...999
D06 (if enable)	Number of energy meter connected on FBus:	Number of energy meter in modBus	0	---	0...12
	Type of energy meter:	Type of energy meter (0: IME HD; 1: IME D4; 2: Ducati; 3: Gavazzi; 4: Socomec; 5: Electrex)	0	---	0: IME NEMO 96 HD 1: IME NEMO D4 2: DUCATI ENERGIA SMART + 3: GAVAZZI CPT/ WM14-DIN 4: SOCOMEC 5: ELECTREX FEMTO
D07 (if enable)	ModBus address E.meter 1(main):	Address energy meter 1 (GENERAL)	2	---	2...13
	Energy meter 2:	Address energy meter 2	3	--	2...13
	Energy meter 3:	Address energy meter 3	4	--	2...13
	Energy meter 4:	Address energy meter 4	5	--	2...13
	Energy meter 5:	Address energy meter 5	6	--	2...13
	Energy meter 6:	Address energy meter 6	7	--	2...13
...	...	...	...	...	...
D09 (if enable)	---	Enery meter 1 type	---	---	0: IME Nemo 96HD 1: IME Nemo D4 2: Ducati Smart 3: Gavazzi 4: Socomec 5: Electrex
	---	Energy meter 1 address	---	---	2... 13
	---	New address for Gavazzi	1	---	1...255
	---	System type	---	---	0...4
	Primary CT:	CT value high part	---	---	0...999
		CT value low part	---	---	0...999
	---	Secondary CT	---	---	0...5
	Primary VT:	VT value high part	---	---	0...999
		VT value low part	---	---	0...999
	---	Secondary VT	---	---	0...999
	Reset counters:	Reset the counter	0	---	0: NO 1: YES
...	...	...	...	...	...
D21	---	Pusle counter from (pCO5 - ID1, pCO compact - B5)	---	---	0: Counter from ID1 1: Counter from B5
	---	Type device (0: Energy; 1: Water; 2: Gas)	---	---	0: Wh 1: l 2: m^3

	Pulse weight:	Value = pulse x 10^ Pulse_Convertion	0	---	0: 1 1: 1 2: 10 3: 100 4: 1000 5: 10000 6: 100000
	Blackout warning:	Enable blackout warning	0	---	0: NO 1: YES
D22	---	Pusle counter from (pCO5 – ID1, pCO compact – B5)	---	---	0: Counter from ID1 1: Counter from B5
	Pulse lost for	Type device (0: Energy; 1: Water; 2: Gas)	---	---	0: Wh 1: l 2: m^3
	---	New offset for the meter (Value x pulse weight)	0	---	0...999
	Confirm?	New value for pulse counter	0	---	0: NO 1: YES
	Reset meter? ---	Reset the counter	0	---	0: NO 1: YES
		Totally pulse counter digital 0	---	---	0…9
		Totally pulse counter digital 1	---	---	0…9
		Totally pulse counter digital 2	---	---	0…9
		Totally pulse counter digital 3	---	---	0…9
		Totally pulse counter digital 4	---	---	0…9
		Totally pulse counter digital 5	---	---	0…9
		Totally pulse counter digital 6	---	---	0…9
		Totally pulse counter digital 7	---	---	0…9
		Totally pulse counter digital 8	---	---	0…9
		Totally pulse counter digital 9	---	---	0…9
		Totally pulse counter digital 10	---	---	0…9
		Totally pulse counter digital 11	---	---	0…9
		Totally pulse counter digital 12	---	---	0…9
		Totally pulse counter digital 13	---	---	0…9
		Totally pulse counter digital 14	---	---	0…9
		Totally pulse counter digital 15	---	---	0…9
		Type device (0: Energy; 1: Water; 2: Gas)	---	---	0: Wh; 1: l 2: m^3
...	...	...	...	...	...
D27	Enable access point:	Enable access point	---	---	0: NO 1: YES
D28 (if enable)	Access point	Address of access point	---	---	1
	Type of access point:	Type of access point	0	---	0: WITHOUT ROUTER-BRIDGE 1: WITH ROUTER-BRIDGE
	Min address connected to router bridge:	Min address connected to router bridge	0	---	2...13
	Max address connected to router bridge:	Max address connected to router bridge:	0	---	2...13
D29 (if enable	Number of pulse counter(CI sensor):	Number of pulse counter	0	---	0...2
D30	Pulse counter	Address of pulse counter 1	---	---	31...32
	Transmit data cycle:	Data update cycle time	60	s	0...99
		Address of pulse counter 2	---	---	31...32
	---	Transmit data cycle	60	s	0...99
D31	Counter from CI01-ID1 Type of device:	Type device (0: Energy; 1: Water; 2: Gas)	---	---	0: Wh; 1: l 2: m^3
	Pulse weight:	Value = pulse x 10^ Pulse_Convertion	0	---	0: 1 1: 1 2: 10 3: 100 4: 1000 5: 10000 6: 100000
	Pulse lost for	Type device (0: Energy; 1: Water; 2: Gas)	---	---	0: Wh; 1: l 2: m^3

	Confirm?	New value for pulse counter	0	---	0: NO; 1: YES
	---	Totally pulse counter digital 0	---	---	0…9
		Totally pulse counter digital 1	---	---	0…9
		Totally pulse counter digital 2	---	---	0…9
		Totally pulse counter digital 3	---	---	0…9
		Totally pulse counter digital 4	---	---	0…9
		Totally pulse counter digital 5	---	---	0…9
		Totally pulse counter digital 6	---	---	0…9
		Totally pulse counter digital 7	---	---	0…9
		Totally pulse counter digital 8	---	---	0…9
		Totally pulse counter digital 9	---	---	0…9
		Totally pulse counter digital 10	---	---	0…9
		Totally pulse counter digital 11	---	---	0…9
		Totally pulse counter digital 12	---	---	0…9
		Totally pulse counter digital 13	---	---	0…9
		Totally pulse counter digital 14	---	---	0…9
		Totally pulse counter digital 15	---	---	0…9
		Type device (0: Energy; 1: Water; 2: Gas)	---	---	0: Wh; 1: l 2: m^3
...	...	...	...	...	...
D39	By-passed loads	Input channel (pCO5 large – Input ID16, pCO compact – Input ID12	---	---	0: Input ID16 1: Input ID02
	By-pass=	Logic for digital input of load by-passed	0	---	0: IN OPENED 1: IN CLOSED
	---	Remote on-off (pCO 5 large)	---	---	0: 1: Remote ON-OFF
	---	Input ID01			0: 1: Input ID01
	---	Building on logic	0	---	0: IN OPENED 1: IN CLOSED
D40	Alarm active	Output channel (pCO5 large – Output NO13, pCO compact – Output NO1)	---	---	0: Output NO1: 1: Output NO13:
	Output ON=	Logic for relay cut active (0: Normally open; 1: Normally closed)	0	---	0: RELAY CLOSED 1: RELAY OPENED
	Cut active	Output channel (pCO5 large – Output NO14, pCO compact – Output NO6)	---	---	0: Output NO6: 1: Output NO14:
	Output ON=	Logic for relay cut active (0: Normally open; 1: Normally closed)	0	---	0: RELAY CLOSED 1: RELAY OPENED
D41	Number load/s reading from AIN:	Number of load reading from AIN	0	---	0...Max ain loads
D42	Analog input B configuration Probe type:	Specify the analogue input channel Specify the probe type	--- 0	--- ---	1...20 0: NTC 1: PT1000 2: 0-1V 3: 0-10V 4: 0-20mA 5: 4-20mA 6: ON/OFF 7: 0-5V 8: 0.5-4.5V 9: NTC HT 10: -50T90 11: 10T170 12: PT100
	---	Conversion limit min value for the controlled value for active inputs	0	---	-3276.8...3276.7
	---	Conversion limit max value for the controlled value for active inputs	1000	---	-3276.8...3276.7
	Alarm delay:	Specify the alarm delay time	60	s	0...32000
	Offset:	Offset of the probe value	0	---	-3276.8...3276.7
…	…	…	…	…	…
D48	Type load 1:	Phase type load 1 (0: mono-phase; 1: three-phase)	0	---	0: 1-PHASE 1: 3-PHASES
	---	Phase type	---	---	0: P=V x I 1: P=V x I x cosfi x SQR3

	I=	Probe position number: current load 1	0	---	0: - 1: PROBE B1 2: PROBE B2 3: PROBE B3 4: PROBE B6 5: PROBE B7 6: PROBE B8 7: PARAMETER
	V=	Probe position number: voltage load 1	0	---	0: PARAMETER 1: PROBE B1 2: PROBE B2 3: PROBE B3 4: PROBE B6 5: PROBE B7 6: PROBE B8
	---	Fixed Cosfi load 1	0.0	---	0.0...1.0
	---	Fixed voltage load 1	0.0	V	0.0...999.9
	Reset:	Reset energy load 1	0	---	0: NO 1: YES
...	...	...	...	...	...
D54	DEFAULT INSTALLATION Delete user parameters and install global default:	Manual Inatallation of device default values (0: No default, 1: Default)	0	---	0: NO 1: YES
	---	Manual Inatallation of device default values (0: No default, 1: Default)	0	---	0: 1: Please wait...

Mask index	Display description	Description	Def.	UOM	Values
E.Load config. (The I/Os available depend on the selected configuration, the following are just some examples)					
E01	Load number:	Loads number	4	---	pCO5 large: 0...12 pCO compact: 0...4
	Delay between ON of different loads:	Delay between ON of different loads	5	s	0...180
E02	Label:	Label of load 1	0	---	See NOTE 1
	---	Load output channel (pCO5 large – NO1, pCO compact – NO2)	---	---	0: Load output NO01 1: Load output NO02
	Load ON=	Logic for relay load 1 (0: Normally open; 1: Normally closed)	0	---	0: RELAY CLOSED 1: RELAY OPENED
	---	Manual input channel (pCO5 large – ID4, pCO compact – B5)	---	---	0: Manual input ID4 1: Manual input B5
	Button:	Logic for digital input of manual load 1	0	---	0: N.C. 1: N.O.
E03	---	Label of load 1	---	---	See NOTE 1
	Scheduler:	Enable scheduler of load 1	0	---	0: NO 1: YES
	---	Preopening of load 1	0	min	0...120
	---	Postclosing of load 1	0	min	0...120
	---	Behaviour load 1 in pause between TB (0: Load OFF; 1: Load ON; 2: AUTO)	0	---	0: OFF BETWEEN BANDS 1: ON BETWEEN BANDS 2: PRE-POST BETWEEN BANDS
	---	Enable cut of load 1	0	---	0: NO 1: YES
	---	Priority to cut the load 1	1	---	1...Max cut load
...	...	...	...	...	...

Mask index	Display description	Description	Def.	UOM	Values
F.Language					
F01	---	Current language index (0=first language)	0	---	0...8
	Enter to change	Esc to confirm	---	---	
	---	Visualization time	60	---	0...999
F02	User:	New service password	1234	---	0...9999
		New Installator password	1234	---	0...9999
F03	Delete data logger:	Reset data logger	0	---	0: NO 1: YES

F04	ModBus for devices Speed:	Baudrate of modbus master protocol	3	---	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200
	Stop bit:	Stop bits of modbus master protocol	1	---	0: 1 1: 2
	Parity:	Parity mode of modbus master protocol	0	---	0: NO 1: PARI 2: DISPARI
	Timeout:	Timeout of modbus master protocol	300	ms	100...5000
F05	Supervisor BMS protocol:	Protocol BMS setting (1: CAREL RS485; 2: ModBus RS485; 3: pCOload local)	1	---	0: NONE 1: CAREL RS485 2: MODBUS RS485 3: pCO MANAGER
	BMS speed:	Setting BMS speed	4	---	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200
	Address:	Address of the controller in a supervisory system network n.2	1	---	1...207
F06		Information of pLoads	---	---	

Mask index	Display description	Description	Def.	UOM	Values
Logout					
	Level:	Show the user level of unit	---	---	0: None 1: User 2: Installator
	Press Enter to logout	Show the information	-----	---	

Note 1:

0: Lights 1	10: Automatic door 1	20: LT Compressor rack 2	30: Oven 3	40: Warm banch 2
1: Lights 2	11: Automatic door 2	21: NT Compressor rack 1	31: Fryer 1	41: Others 1
2: Lights 3	12: Automatic door 3	22: NT Compressor rack 2	32: Fryer 2	42: Others 2
3: Lights 4	13: LT Cabinet 1	23: Banner 1	33: Fryer 3	43: Others 3
4: External lights 1	14: LT Cabinet 2	24: Banner 2	34: Spits 1	44: Others 4
5: External lights 2	15: LT Cabinet 3	25: Parking outside	35: Spits 2	45: Others 5
6: External lights 3	16: NT Cabinet 1	26: Parking	36: Hot-Plate 1	
7: Conditioning 1	17: NT Cabinet 2	27: Covered parking	37: Hot-Plate 2	
8: Conditioning 2	18: NT Cabinet 3	28: Oven 1	38: Lift recharge 1	
9: Conditioning 3	19: LT Compressor rack 1	29: Oven 2	39: Warm banch 1	

Note 2:

0: Disabled	2: ON by scheduler	4: ON by manual	6: ON by SPV	7: OFF by SPV
1: Cut	3: OFF by scheduler	5: OFF by manual		

Note 3:

0: IME Nemo 96HD	2: Ducati Smart	3: Gavazzi	4: Socomec	5: Electrex
1: IME Nemo D4				

10. SUPERVISOR TABLE

The table below shows the variables sent to the supervisor.

Analogue variables

Modbus® address	Carel address	Description	UOM	R/W
1	1	Energy meter 1 (General), Equivalent power	kW	R
2	2	Energy meter 2, Equivalent power	kW	R
3	3	Energy meter 3, Equivalent power	kW	R
4	4	Energy meter 4, Equivalent power	kW	R
5	5	Energy meter 5, Equivalent power	kW	R
6	6	Energy meter 6, Equivalent power	kW	R
7	7	Energy meter 7, Equivalent power	kW	R
8	8	Energy meter 8, Equivalent power	kW	R
9	9	Energy meter 9, Equivalent power	kW	R
10	10	Energy meter 10, Equivalent power	kW	R
11	11	Energy meter 11, Equivalent power	kW	R
12	12	Energy meter 12, Equivalent power	kW	R
13	13	Energy meter 1 (General), Line 1 current	A	R
14	14	Energy meter 2, Line 1 current	A	R
15	15	Energy meter 3, Line 1 current	A	R
16	16	Energy meter 4, Line 1 current	A	R
17	17	Energy meter 5, Line 1 current	A	R
18	18	Energy meter 6, Line 1 current	A	R
19	19	Energy meter 7, Line 1 current	A	R
20	20	Energy meter 8, Line 1 current	A	R
21	21	Energy meter 9, Line 1 current	A	R
22	22	Energy meter 10, Line 1 current	A	R
23	23	Energy meter 11, Line 1 current	A	R
24	24	Energy meter 12, Line 1 current	A	R
25	25	Energy meter 1 (General), Line 2 current	A	R
26	26	Energy meter 2, Line 2 current	A	R
27	27	Energy meter 3, Line 2 current	A	R
28	28	Energy meter 4, Line 2 current	A	R
29	29	Energy meter 5, Line 2 current	A	R
30	30	Energy meter 6, Line 2 current	A	R
31	31	Energy meter 7, Line 2 current	A	R
32	32	Energy meter 8, Line 2 current	A	R
33	33	Energy meter 9, Line 2 current	A	R
34	34	Energy meter 10, Line 2 current	A	R
35	35	Energy meter 11, Line 2 current	A	R
36	36	Energy meter 12, Line 2 current	A	R
37	37	Energy meter 1 (General), Line 3 current	A	R
38	38	Energy meter 2, Line 3 current	A	R
39	39	Energy meter 3, Line 3 current	A	R
40	40	Energy meter 4, Line 3 current	A	R
41	41	Energy meter 5, Line 3 current	A	R
42	42	Energy meter 6, Line 3 current	A	R
43	43	Energy meter 7, Line 3 current	A	R
44	44	Energy meter 8, Line 3 current	A	R
45	45	Energy meter 9, Line 3 current	A	R
46	46	Energy meter 10, Line 3 current	A	R
47	47	Energy meter 11, Line 3 current	A	R
48	48	Energy meter 12, Line 3 current	A	R
49	49	Energy meter 1 (General), Power factor	---	R
50	50	Energy meter 2, Power factor	---	R
51	51	Energy meter 3, Power factor	---	R
52	52	Energy meter 4, Power factor	---	R
53	53	Energy meter 5, Power factor	---	R
54	54	Energy meter 6, Power factor	---	R
55	55	Energy meter 7, Power factor	---	R
56	56	Energy meter 8, Power factor	---	R
57	57	Energy meter 9, Power factor	---	R
58	58	Energy meter 10, Power factor	---	R
59	59	Energy meter 11, Power factor	---	R
60	60	Energy meter 12, Power factor	---	R

Tab. 10.a

Integer variables

Modbus® address	Carel address	Description	UOM	R/W	R/W
5001	1	Energy meter 1 (general), Energy (high part)	kWh	R	
5002	2	Energy meter 1 (General), Energy (low part)	kWh	R	
5003	3	Energy meter 2, Energy (high part)	kWh	R	
5004	4	Energy meter 2, Energy (low part)	kWh	R	
5005	5	Energy meter 3, Energy (high part)	kWh	R	
5006	6	Energy meter 3, Energy (low part)	kWh	R	
5007	7	Energy meter 4, Energy (high part)	kWh	R	
5008	8	Energy meter 4, Energy (low part)	kWh	R	
5009	9	Energy meter 5, Energy (high part)	kWh	R	
5010	10	Energy meter 5, Energy (low part)	kWh	R	
5011	11	Energy meter 6, Energy (high part)	kWh	R	
5012	12	Energy meter 6, Energy (low part)	kWh	R	
5013	13	Energy meter 7, Energy (high part)	kWh	R	
5014	14	Energy meter 7, Energy (low part)	kWh	R	
5015	15	Energy meter 8, Energy (high part)	kWh	R	
5016	16	Energy meter 8, Energy (low part)	kWh	R	
5017	17	Energy meter 9, Energy (high part)	kWh	R	
5018	18	Energy meter 9, Energy (low part)	kWh	R	
5019	19	Energy meter 10, Energy (high part)	kWh	R	
5020	20	Energy meter 10, Energy (low part)	kWh	R	
5021	21	Energy meter 11, Energy (high part)	kWh	R	
5022	22	Energy meter 11, Energy (low part)	kWh	R	
5023	23	Energy meter 12, Energy (high part)	kWh	R	
5024	24	Energy meter 12, Energy (low part)	kWh	R	
5025	25	Current hour	h	R/W	
5026	26	Current minutes	min	R/W	
5027	27	Current day	day	R/W	
5028	28	Current month	month	R/W	
5029	29	Current year	year	R/W	
5030	30	Start time band 1, ordinary day	---	R/W	
5031	31	End time band 1, ordinary day	---	R/W	
5032	32	Start time band 2, ordinary day	---	R/W	
5033	33	End time band 2, ordinary day	---	R/W	
5034	34	Start time band 1, special day	---	R/W	
5035	35	End time band 1, special day	---	R/W	
5036	36	Start time band 2, special day	---	R/W	
5037	37	End time band 2, special day	---	R/W	
5038	38	Start time band, short day	---	R/W	
5039	39	End time band, short day	---	R/W	
5040	40	Type of day, Monday (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5041	41	Type of day, Tuesday (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5042	42	Type of day, Wednesday (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5043	43	Type of day, Thursday (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5044	44	Type of day, Friday (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5045	45	Type of day, Saturday (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5046	46	Type of day, Sunday (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5047	47	Start day-month, special period 1	---	R/W	
5048	48	End day-month, special period 1	---	R/W	
5049	49	Behaviour in special period 1 (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5050	50	Start day-month, special period 2	---	R/W	
5051	51	End day-month, special period 2	---	R/W	
5052	52	Behaviour in special period 2 (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5053	53	Start day-month, special period 3	---	R/W	
5054	54	End day-month, special period 3	---	R/W	
5055	55	Behaviour in special period 3 (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5056	56	Start day-month, special period 4	---	R/W	
5057	57	End day-month, special period 4	---	R/W	
5058	58	Behaviour in special period 4 (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5059	59	Start day-month, special period 5	---	R/W	
5060	60	End day-month, special period 5	---	R/W	
5061	61	Behaviour in special period 5 (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5062	62	Start day-month, special period 6	---	R/W	
5063	63	End day-month, special period 6	---	R/W	
5064	64	Behaviour in special period 6 (0= ordinary; 1= special; 2= short; 3= closing)	---	R/W	
5065	65	Start day-month, special period 7	---	R/W	

Modbus® address	Carel address	Description	UOM	R/W	R/W
5066	66	End day-month, special period 7		---	R/W
5067	67	Behaviour in special period 7 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5068	68	Start day-month, special period 8		---	R/W
5069	69	End day-month, special period 8		---	R/W
5070	70	Behaviour in special period 8 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5071	71	Start day-month, special period 9		---	R/W
5072	72	End day-month, special period 9		---	R/W
5073	73	Behaviour in special period 9 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5074	74	Start day-month, special period 10		---	R/W
5075	75	End day-month, special period 10		---	R/W
5076	76	Behaviour in special period 10 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5077	77	Start day-month, special period 11		---	R/W
5078	78	End day-month, special period 11		---	R/W
5079	79	Behaviour in special period 11 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5080	80	Start day-month, special period 12		---	R/W
5081	81	End day-month, special period 12		---	R/W
5082	82	Behaviour in special period 12 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5083	83	Start day-month, special period 13		---	R/W
5084	84	End day-month, special period 13		---	R/W
5085	85	Behaviour in special period 13 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5086	86	Start day-month, special period 14		---	R/W
5087	87	End day-month, special period 14		---	R/W
5088	88	Behaviour in special period 14 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5089	89	Start day-month, special period 15		---	R/W
5090	90	End day-month, special period 15		---	R/W
5091	91	Behaviour in special period 15 (0= ordinary; 1= special; 2= short; 3= closing)		---	R/W
5092	92	Before-opening, load 1		min	R/W
5093	93	After-closing, load 1		min	R/W
5094	94	Behaviour of load 1 between time bands		---	R/W
5095	95	Load cut-off priority, load 1		---	R/W
5096	96	Before-opening, load 2		min	R/W
5097	97	After-closing, load 2		min	R/W
5098	98	Behaviour of load 2 between time bands		---	R/W
5099	99	Load cut-off priority, load 2		---	R/W
5100	100	Before-opening, load 3		min	R/W
5101	101	After-closing, load 3		min	R/W
5102	102	Behaviour of load 3 between time bands		---	R/W
5103	103	Load cut-off priority, load 3		---	R/W
5104	104	Before-opening, load 4		min	R/W
5105	105	After-closing, load 4		min	R/W
5106	106	Behaviour of load 4 between time bands		---	R/W
5107	107	Load cut-off priority, load 4		---	R/W
5108	108	Before-opening, load 5		min	R/W
5109	109	After-closing, load 5		min	R/W
5110	110	Behaviour of load 5 between time bands		---	R/W
5111	111	Load cut-off priority, load 5		---	R/W
5112	112	Before-opening, load 6		min	R/W
5113	113	After-closing, load 6		min	R/W
5114	114	Behaviour of load 6 between time bands		---	R/W
5115	115	Load cut-off priority, load 6		---	R/W
5116	116	Before-opening, load 7		min	R/W
5117	117	After-closing, load 7		min	R/W
5118	118	Behaviour of load 7 between time bands		---	R/W
5119	119	Load cut-off priority, load 7		---	R/W
5120	120	Before-opening, load 8		min	R/W
5121	121	After-closing, load 8		min	R/W
5122	122	Behaviour of load 8 between time bands		---	R/W
5123	123	Load cut-off priority, load 8		---	R/W
5124	124	Before-opening, load 9		min	R/W
5125	125	After-closing, load 9		min	R/W
5126	126	Behaviour of load 9 between time bands		---	R/W
5127	127	Load cut-off priority, load 9		---	R/W
5128	128	Before-opening, load 10		min	R/W
5129	129	After-closing, load 10		min	R/W
5130	130	Behaviour of load 10 between time bands		---	R/W
5131	131	Load cut-off priority, load 10		---	R/W
5132	132	Before-opening, load 11		min	R/W

Modbus® address	Carel address	Description	UOM	R/W	R/W
5133	133	After-closing, load 11		min	R/W
5134	134	Behaviour of load 11 between time bands		---	R/W
5135	135	Load cut-off priority, load 11		---	R/W
5136	136	Before-opening, load 12		min	R/W
5137	137	After-closing, load 12		min	R/W
5138	138	Behaviour of load 12 between time bands		---	R/W
5139	139	Load cut-off priority, load 12		---	R/W
5140	140	Power threshold 0 for load cut-off		KW	R/W
5141	141	Power threshold 1 for load cut-off		kW	R/W
5142	142	Power threshold 2 for load cut-off		kW	R/W
5143	143	Power threshold 3 for load cut-off		kW	R/W
5144	144	Power percentage for load cut-off		---	R/W
5145	145	Energy threshold for load cut-off		kWh	R/W
5146	146	Energy monitoring time		min	R/W
5147	147	Energy percentage for load cut-off		---	R/W
5148	148	Delay between cutting off different loads		---	R/W
5149	149	Minimum load cut-off duration		min	R/W
5150	150	Maximum load cut-off duration		min	R/W
5151	151	32-bit pulse counter (high part)		---	R
5152	152	32-bit pulse counter (low part)		---	R
5153	153	Type of day for the next event		---	R
5154	154	SW version		---	R
5155	155	SW date		---	R
5156	156	Manual control of load 1 from SPV		---	R/W
5157	157	Manual control of load 2 from SPV		---	R/W
5158	158	Manual control of load 3 from SPV		---	R/W
5159	159	Manual control of load 4 from SPV		---	R/W
5160	160	Manual control of load 5 from SPV		---	R/W
5161	161	Manual control of load 6 from SPV		---	R/W
5162	162	Manual control of load 7 from SPV		---	R/W
5163	163	Manual control of load 8 from SPV		---	R/W
5164	164	Manual control of load 9 from SPV		---	R/W
5165	165	Manual control of load 10 from SPV		---	R/W
5166	166	Manual control of load 11 from SPV		---	R/W
5167	167	Manual control of load 12 from SPV		---	R/W
5168	168	Load 12 label	**SEE NOTE 1**	---	R/W
5169	169	Load 11 label	**SEE NOTE 1**	---	R/W
5170	170	Load 10 label	**SEE NOTE 1**	---	R/W
5171	171	Load 9 label	**SEE NOTE 1**	---	R/W
5172	172	Load 8 label	**SEE NOTE 1**	---	R/W
5173	173	Load 7 label	**SEE NOTE 1**	---	R/W
5174	174	Load 6 label	**SEE NOTE 1**	---	R/W
5175	175	Load 5 label	**SEE NOTE 1**	---	R/W
5176	176	Load 4 label	**SEE NOTE 1**	---	R/W
5177	177	Load 3 label	**SEE NOTE 1**	---	R/W
5178	178	Load 2 label	**SEE NOTE 1**	---	R/W
5179	179	Load 1 label	**SEE NOTE 1**	---	R/W
5180	180	Value = No. pulses x 10^ Pulse_Conversion		---	R
5181	181	Load 1 status	**SEE NOTE 2**	---	R
5182	182	Load 2 status	**SEE NOTE 2**	---	R
5183	183	Load 3 status	**SEE NOTE 2**	---	R
5184	184	Load 4 status	**SEE NOTE 2**	---	R
5185	185	Load 5 status	**SEE NOTE 2**	---	R
5186	186	Load 6 status	**SEE NOTE 2**	---	R
5187	187	Load 7 status	**SEE NOTE 2**	---	R
5188	188	Load 8 status	**SEE NOTE 2**	---	R
5189	189	Load 9 status	**SEE NOTE 2**	---	R
5190	190	Load 10 status	**SEE NOTE 2**	---	R
5191	191	Load 11 status	**SEE NOTE 2**	---	R
5192	192	Load 12 status	**SEE NOTE 2**	---	R
5193	193	Type of pulse counter device (0: Energy; 1: Water; 2: Gas)		---	R/W
5194	194	Type of day, active		---	R
5195	195	Day of next event		---	R
5196	196	Month of next event		---	R
5197	197	Percentage at power threshold		---	R
5198	198	Percentage at energy threshold		---	R

Modbus® address	Carel address	Description	UOM	R/W	R/W
5199	199	Number of energy meters in Modbus®	---		R/W
5200	200	Number of loads	---		R/W

Tab. 10.b

Note 1:

0: lights 1
1: lights 2
2: lights 3
3: lights 4
4: external lights 1
5: external lights 2
6: external lights 3
7: conditioning 1
8: conditioning 2
9: conditioning 3
10: automatic door 1
11: automatic door 2
12: automatic door 3
13: lt cabinet 1
14: lt cabinet 2
15: lt cabinet 3
16: nt cabinet 1
17: nt cabinet 2
18: nt cabinet 3
19: lt compressor rack 1
20: lt compressor rack 2
21: nt compressor rack 1
22: nt compressor rack 2
23: banner 1
24: banner 2
25: parking outside
26: parking
27: overed parking
28: oven 1
29: oven 2
30: oven 3
31: fryer 1
32: fryer 2
33: fryer 3
34: spits 1
35: spits 2
36: hot-plate 1
37: hot-plate 2
38: lift recharge 1
39: warm banch 1
40: warm banch 2
41: others 1
42: others 2
43: others 3
44: others 4
45: others 5

Note 2:

0: disabled
1: cut
2: ON by scheduler
3: OFF by scheduler
4: Manual ON
5: Manual OFF
6: ON by supervisor
7: OFF by supervisor
8: Waiting timings between loads

Digital variables

Modbus® address	Carel address	Description	UOM	R/W
1	1	General alarm	---	R
2	2	Large board	---	R
27	27	Energy meter 1 (General), Reset energy	---	R/W
28	28	Energy meter 2, Reset counters	---	R/W
29	29	Energy meter 3, Reset counters	---	R/W
30	30	Energy meter 4, Reset counters	---	R/W
31	31	Energy meter 5, Reset counters	---	R/W
32	32	Energy meter 6, Reset counters	---	R/W
33	33	Energy meter 7, Reset counters	---	R/W
34	34	Energy meter 8, Reset counters	---	R/W
35	35	Energy meter 9, Reset counters	---	R/W
36	36	Energy meter 10, Reset counters	---	R/W
37	37	Energy meter 11, Reset counters	---	R/W
38	38	Energy meter 12, Reset counters	---	R/W
39	39	Enable scheduler for load 1	---	R/W
40	40	Enable load cut-off for load 1	---	R/W
41	41	Enable scheduler for load 2	---	R/W
42	42	Enable load cut-off for load 2	---	R/W
43	43	Enable scheduler for load 3	---	R/W
44	44	Enable load cut-off for load 3	---	R/W
45	45	Enable scheduler for load 4	---	R/W
46	46	Enable load cut-off for load 4	---	R/W
47	47	Enable scheduler for load 5	---	R/W
48	48	Enable load cut-off for load 5	---	R/W
49	49	Enable scheduler for load 6	---	R/W
50	50	Enable load cut-off for load 6	---	R/W
51	51	Enable scheduler for load 7	---	R/W
52	52	Enable load cut-off for load 7	---	R/W
53	53	Enable scheduler for load 8	---	R/W
54	54	Enable load cut-off for load 8	---	R/W

55	55	Enable scheduler for load 9	---	R/W
56	56	Enable load cut-off for load 9	---	R/W
57	57	Enable scheduler for load 10	---	R/W
58	58	Enable load cut-off for load 10	---	R/W
59	59	Enable scheduler for load 11	---	R/W
60	60	Enable load cut-off for load 11	---	R/W
61	61	Enable scheduler for load 12	---	R/W
62	62	Enable load cut-off for load 12	---	R/W
63	63	Blackout ALARM	---	R
64	64	Load 1 status	---	R
65	65	Clock alarm board	---	R
66	66	Load 2 status	---	R
67	67	P-memory ALARM (internal error)	---	R
68	68	Load 3 status	---	R
69	69	Energy meter 1 disconnected ALARM	---	R
70	70	Load 4 status	---	R
71	71	Energy meter 2 disconnected ALARM	---	R
72	72	Load 5 status	---	R
73	73	Energy meter 3 disconnected ALARM	---	R
74	74	Load 6 status	---	R
75	75	Energy meter 4 disconnected ALARM	---	R
76	76	Load 7 status	---	R
77	77	Energy meter 5 disconnected ALARM	---	R
78	78	Load 8 status	---	R
79	79	Energy meter 6 disconnected ALARM	---	R
80	80	Load 9 status	---	R
81	81	Energy meter 7 disconnected ALARM	---	R
82	82	Load 1 0 status	---	R
83	83	Energy meter 8 disconnected ALARM	---	R
84	84	Load 11 status	---	R
85	85	Energy meter 9 disconnected ALARM	---	R
86	86	Load 12 status	---	R
87	87	ON-OFF digital input status	---	R
88	88	IN 1 for energy/power threshold	---	R
89	89	IN 2 for energy/power threshold	---	R
90	90	Load bypassed digital input status	---	R
91	91	RESET ALARMS	---	R/W
92	92	General on-off	---	R/W
93	93	General on-off (0: Off; 1: On)	---	R
94	94	Energy meter 10 disconnected ALARM	---	R
95	95	Energy meter 11 disconnected ALARM	---	R
96	96	Energy meter 12 disconnected ALARM	---	R
97	97	Load bypassed ALARM	---	R

Tab. 10.c

11. ALARM TABLE

Alarm code	Display / Description	Reset	Action	Alarm relay
AL01	Clock card error or not connected	Manual	No	YES
AL02	Extended memory error	Manual	No	YES
AL03	Load bypassed	Automatic	No	YES
AL04	Set counter manually	Manual	No	YES
AL05	Energy meter 1 offline	Automatic	Load cut-off disabled	YES
AL06	Energy meter 2 offline	Automatic	No	YES
AL07	Energy meter 3 offline	Automatic	No	YES
AL08	Energy meter 4 offline	Automatic	No	YES
AL09	Energy meter 5 offline	Automatic	No	YES
AL10	Energy meter 6 offline	Automatic	No	YES
AL11	Energy meter 7 offline	Automatic	No	YES
AL12	Energy meter 8 offline	Automatic	No	YES
AL13	Energy meter 9 offline	Automatic	No	YES
AL14	Energy meter 10 offline	Automatic	No	YES
AL15	Energy meter 11 offline	Automatic	No	YES
AL16	Energy meter 12 offline	Automatic	No	YES
AL17	Probe B1 fault	Automatic	No	YES
AL18	Probe B1 fault	Automatic	No	YES
AL19	Probe B3 fault	Automatic	No	YES
AL20	Probe B6 fault	Automatic	No	YES
AL21	Probe B7 fault	Automatic	No	YES
AL22	Probe B8 fault	Automatic	No	YES
AL23	Manually set counter ID17	Automatic	No	YES
AL24	Manually set counter ID18	Automatic	No	YES
AL25	Access Point offline/disconnected	Automatic	No	YES
AL26	CI pulse counter add. 31, offline	Automatic	No	YES
AL27	CI pulse counter add. 32, offline	Automatic	No	YES
AL28	CI pulse counter add. 31, general alarm	Automatic	No	YES
AL29	CI pulse counter add. 31, battery discharged	Automatic	No	YES
AL30	CI pulse counter add. 31, general alarm	Automatic	No	YES
AL31	CI pulse counter add. 32, battery discharged	Automatic	No	YES

Tab. 11.a

12. PLOADS FEATURES

12.1 Installation warnings - intended environments and connection

Avoid installing the boards in environments with the following characteristics:
- relative humidity greater than the 90%;
- strong vibrations or knocks;
- exposure to continuous water sprays and exposure to aggressive and polluting atmospheres(e.g.: sulphur and ammonia fumes, saline mist, smoke) with consequent corrosion and/or oxidation;
- strong magnetic and/or radio frequency interference (therefore avoid installing the units near transmitting antennae);
- exposure to direct sunlight and to the elements in general;
- large and rapid fluctuations in the room temperature;
- environments where explosives or mixes of flammable gases are present;
- exposure to dust (formation of corrosive patina with possible oxidation and reduction of insulation).

The following warnings must be observed for connection:
- install a power supply disconnect device in compliance with standards in force;
- a power supply voltage other than the rated value may seriously damage the system;
- use cable ends suitable for the corresponding terminals. Loosen each screw and insert the cable ends, then tighten the screws. When the operation is completed, slightly tug the cables to check they are sufficiently tight;
- separate as much as possible the probe signal and digital input cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance. Never insert power cables (including the electrical cables) and probe signal cables in the same conduits. Do not install probe cables in the immediate vicinity of power devices (contactors, circuit breakers or similar);
- reduce the path of probe cables as much as possible, and avoid spiral paths that enclose power devices.
- avoid touching or nearly touching the electronic components fitted on the boards to avoid electrostatic discharges (extremely damaging) from the operator to the components;
- separate the power supply to digital outputs from the power supply to pLoads;
- do not secure the cables to the terminals by pressing the screwdriver with excessive force, to avoid damaging the controller;
- disconnect the controller from the power supply before performing any type of maintenance or assembly operations;
- the controller must be installed inside a panel and must not be accessible, to avoid knocks and bumps;
- if the device is used in a way not specified by the manufacturer, its rated protection may be affected;
- in the event of faults on the controller and the optional cards, only contact CAREL for repairs;
- only fit optional cards and connectors supplied by CAREL.

pLoads does not provide protection against short-circuits and overloads, consequently suitable protection devices must be installed on the power supply lines (2.5 AT fuses) and 230 Vac digital input lines (500 mAT fuses).
pLoads is not a device that guarantees electrical safety, but rather suitable operation: to prevent short-circuits from causing fire in the electrical panels, the customer must install appropriate electromechanical protection devices on the lines in question (fuses or the like). In addition, the type of software dos not guarantee electrical safety.

12.2 Uploading the application program

When a new software release becomes available, the application program can be loaded to the flash memory in different ways:

1. by key:
   - smart key PCOS00AKY0;
   - USB pen drive;
2. by PC:
   - 485 serial port (28.8 kbps and 115.2 kbps) using USB-485 adapter code "CVSTDUTLF0";
   - USB slave.

To upload via PC, the "pCO Manager" manager program is available free-of-charge on the website ksa.carel.com.

USB port operation

pLoads features two different USB ports (host and slave), to be used during installation and diagnostics. The host port can be connected to USB storage devices (pendrive, portable hard disk, etc. with maximum current 200 mA) for performing a series of operations:

- upload to pLoads files in the removable drive: application, parameters in buffer memory, configuration files for logs, BIOS.
- download files from pLoads to the removable drive: application, parameters in buffer memory, data log, BIOS.

To access the menu used to manage the contents of the removable drive connected to the host port, simply hold ALARM+ENTER for a few seconds, until the first BIOS system screen is shown. Selecting the FLASH/USB MEMORY item and then USB PEN DRIVE accesses the main menu used to choose the operation, upload or download. When selecting UPLOAD, a further option is shown to specify manual access to the contents of the pen drive (browsing the directories and files) or automatic access (direct access to the configuration files). In addition, if the peripheral connected contains a file called AUTORUN.TXT that is compliant with the corresponding specifications, the terminal will automatically show a screen for the direct activation of the specific function this refers to.
The DOWNLOAD option is used to download the application, the logs, the parameters and the BIOS. Note that during the upload and download procedures through the host port, operation of the pLoads BIOS is limited solely to USB management.

The USB slave port can be connected directly to a PC, without needing additional devices. To use this function, the pCO Manager software is required. The following operations are available through this port

- upload files to pLoads,
- download data to the PC from pLoads,
- manage the NAND flash,
- commissioning.

Applications or BIOS can be uploaded through the slave port. The application includes any files relating to the parameters in the buffer memory and any configuration files for acquiring the logs. The download operations allowed are all those featured in pCO Manager, that is, downloading the logs and the contents of T and P memories.
The slave port connection can also be used to manage the NAND flash, with the possibility to upload/download the files, delete files or completely format the memory. The same port can also be used for commissioning, as long as a suitable application is used, together with the information contained in the .2cf file. Important: the two USB ports cannot be used together. The two ports must be used distinctly to ensure correct operation of pLoads.

12.3 Power supply

A class II safety transformer with a minimum rating of 50 VA and a 2.5 AT fuse must be used in the installation to supply just one pLoads controller. The power supply to the pLoads controller and terminal (or pLoads controllers and terminals) should be separated from the power supply to the other electrical devices (contactors and other electromechanical components) inside the electrical panel. If the secondary of the transformer is earthed, make sure that the earth wire is connected to terminal G0. This is true for all the devices connected to the pLoads. If more than one pLoads controller is connected, make sure that the G and G0 references are observed (G0 must be maintained for all boards).

12.4 Technical specifications

Physical specifications

	pLoads Compact	pLoads Large
dimensions	all the versions are available on 6 DIN modules, 105x115x60 mm	Large version installable on 18 DIN modules, 110 x 315 x 60 mm
assembly	DIN rail	

Tab. 12.a

Plastic case

- Fitted on DIN rail in accordance with DIN 43880 and IEC EN 50022;
- Material: technopolymer;
- Flammability (pLoads Compact): V2 (UL94) and 960°C (IEC 695);
- Flammability (pLoads Large): V2 (UL94) and 850 °C (in accordance with IEC 60695);
- Ball pressure test 125 °C;
- Resistance to creeping current ≥ 250 V_
- Colour grey RAL7035

Electrical specifications

	pLoads Compact	pLoads Large
DC power supply	48 Vdc (36 Vmin to 72 Vmax)	28 to 36 Vdc +10/-20%
AC power supply	24 Vac +10/-15 %, 50/60 Hz	
Maximum power	14 VA/11 W	45 VA/20 W
CPU	H8SX/1651 32-bit, 50 MHz	
Program memory (FLASH)	2+2 MBytes	
Working cycle duration	average 0.5 s	
Clock	Available as standard and integrated into main board	
Clock precision	100 ppm	
Battery specifications	lithium button battery code CR2430 voltage 3 Vdc (size 24x3 mm)	

Tab. 12.b

Analogue inputs

Max. cable length	10 m	
Analogue conversion	10-bit A/D converter embedded in CPU	
	pLoads Compact	pLoads Large
CAREL NTC -50T90 °C; R/T 10 kΩ at 25°C or HT NTC0T150 °C	--	--
0 to 1 Vdc voltage	B1, B2, B3	B1, B2, B3, B6, B7, B8
0 to 5 Vdc ratiometric	B1, B2, B3	B1, B2, B3, B6, B7, B8
0 to 10 Vdc voltage	B1, B2, B3	B1, B2, B3, B6, B7, B8
0 to 20 mA or 4 to 20 mA current	B1, B2	B1, B2, B3, B6, B7, B8
PT1000 -100T200 °C; R/T 1000 Ω at 0 °C	--	--
Voltage-free digital input (5 mA)	--	--
Classification of measuring circuits (IEC EN 61010-1)	--	
Total	3	6

Tab. 12.c

Warning: the 21 Vdc available at terminal +Vdc (J2) can be used to power any active probes; the maximum current is Imax=60 mA for pLoads Compact, Imax=150 mA for pLoads Large, protected against short-circuits. To power the 0 to 5 Vdc ratiometric probes, use +5 VREF, maximum current available Imax=60 mA, protected against short-circuits. Only use these voltages to power the active probes connected.
Warning: separate as much as possible probe signal and digital input cables from the inductive load and power cables, to avoid possible electromagnetic disturbance.

Digital inputs

Max. cable length	10 m	
Type	Not optically-isolated, voltage-free contact	
Power supply	Internal	
	pLoads Compact	pLoads Large
Multifunction analogue inputs	--	--
Fast digital input	ID1 (opto-isolated)	B5 (not opto-isolated)
Normal digital input	1	18
Total	2	18

Tab. 12.d

Warnings:
for DC digital inputs (Vdc), either the + or the - can be connected to the common (IDC1).
the rating of the external contact connected to the digital inputs must be at least 5 mA.
Note: separate as much as possible the probe signal and digital input cables from the inductive load and power cables, to avoid possible electromagnetic disturbance.

Analogue outputs

Max. cable length	--	
Resolution	--	
Precision	--	
Maximum load	--	
	pLoads Compact	pLoads Large
Type	--	--
Power supply	--	--
0 to 10 Vdc analogue output	--	--
PWM phase control analogue output with 5 Vdc pulse of programmable duration	--	--
Total	--	--

Tab. 12.e

Warnings:
A 0 to 10 Vdc analogue output can be connected in parallel to other outputs of the same type, or alternatively to an external source of voltage. The higher voltage will be considered. Correct operation is not guaranteed if actuators with voltage inputs are connected. Power the VG-VG0 analogue outputs at the same voltage as on G-G0: Connect G0 to VG0 and G to VG. This is valid for both alternating and direct current power supplies.
For phase control outputs (PWM), note that synchronicity (zero crossing) is taken from G/G0 and only with 24 Vac power supply (not Vdc).

Digital outputs

type	pLoads Compact	pLoads Large
maximum number	6	14

To simplify wiring, the common terminals of some relays have been grouped together, depending on the insulation distance. Within a group, the relays only have basic insulation between them and thus must be powered at the same voltage (generally 24 Vac or 110 to 230 Vac). Between groups there is reinforced insulation, thus the groups can be powered at different voltages.

Make sure that the current running through the common terminals does not exceed the rated current of an individual terminal, that is, 8 A. Minimum relay contact current: 50 mA.

Insulation distance	The relay outputs have different features, depending on the model of pLoads. The outputs can be divided into groups. Between groups (cells in the table) there is double insulation and consequently these may have different voltages. There is also double insulation between each terminal of the digital outputs and the rest of the controller. The relays belonging to the same group (individual cell in the table) have basic insulation and therefore must have the same power supply (24 or 230 Vac).										
Makeup of the groups		group 1	group 2	group 3	group 4	group 5	group 6	group 7	group 8	group 9	group 10
	Large	1-3	4-6	7	8	9-11	12	13	14	15	16-18
	Relay type	Type A	Type A	Type A	Type A	Type A	Type A	Type A	Type A	Type A	Type A
	Compact	1	2	3-7	-	-	-	-	-	-	-
	Relay type	Type A	Type A	Type B	-	-	-	-	-	-	-
	Note: the relays in the individual cells of the table have basic insulation, while there is double insulation between groups of cells.										
Changeover contacts	pLoads Large: relays 8, 12, 13, 14 and 15 (total 5) pLoads Compact: relay 1 (total 1)										
Switchable power	type A relay	SPDT relay: UL873: 2.5 A resistive, 2 A FLA, 12 A LRA, 250 Vac, C300 pilot duty (30,000 cycles) EN60730-1: 2 A resistive, 2 A inductive, cos(phi)=0.6, 2 (2) A (100,000 cycles)									
	type B relay	SPST relay: UL873: 1 A resistive, 1 A FLA, 6 A LRA, 250 Vac, D300 pilot duty (30,000 cycles) EN60730-1: 1 A resistive, 1 A inductive, cos(phi)=0.6, 1 (1) A (100,000 cycles)									
SSR outputs	pLoads Large: relays 7, 12 and 14 or 7, 12, 14 and 15 (total 3 or 4) working voltage: 24 Vac/Vdc; maximum power: 10 W, resistive load working voltage: 110/230 Vac/Vdc; maximum power: 10 W, resistive load										

12.5 Other features

Operating conditions	-10T60 °C, 90% RH non-condensing
Storage and transport conditions	-20T70 °C, 90% RH non-condensing
Index of protection	IP40 on the front panel only
Environmental pollution	2
Class according to protection against electric shock	to be integrated into Class I and/or II appliances
Period of stress across the insulating parts	long
Type of action	1 C
Type of disconnection or microswitching	microswitching
Category of resistance to heat and fire	Category D (UL94–V0)
Immunity against voltage surges	Category II
Ageing characteristics (operating hours)	80,000
No. of automatic operating cycles	100,000 (EN 60730-1); 30,000 (UL 873)
Software class and structure	Class A
Category of immunity to voltage surges	Category III (IEC EN 61000-4-5)

Tab. 12.f

The device is not designed to be hand-held.

12.6 Physical dimensions

pLoads Compact

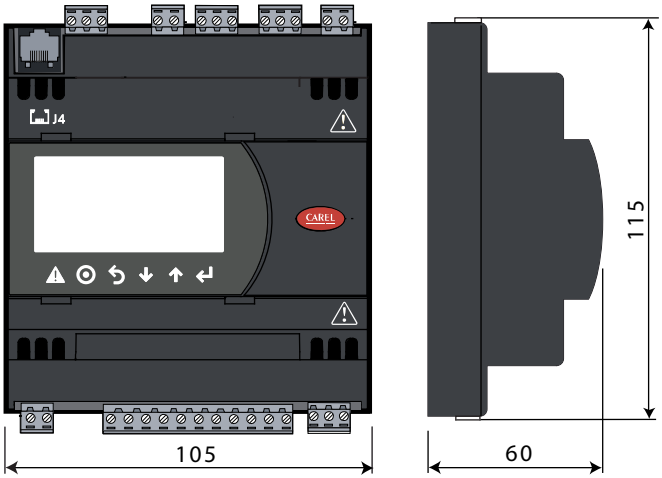


Fig. 12.a

pLoads Large

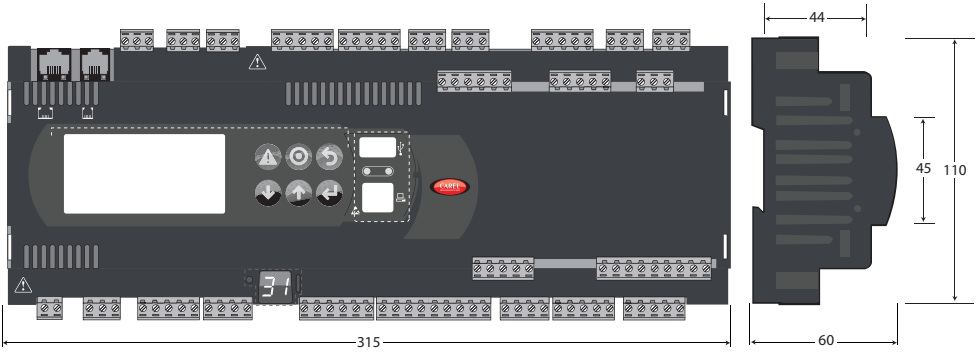


Fig. 12.b

For further information, see the pCO sistema user manual.

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